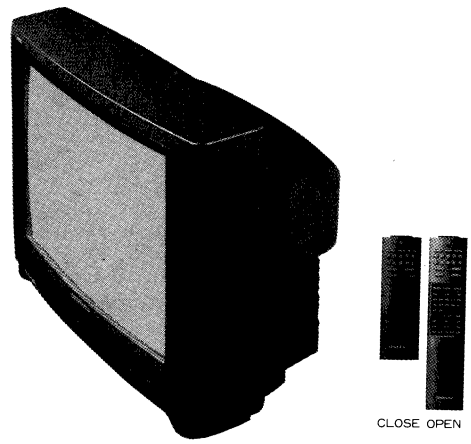
SAMSUNG Electronics

SERVICE MANUAL

MODEL : CX7226WT/SGX
CHASSIS : S60MT & RM113,TTX

COLOUR TELEVISION RECEIVER



SPECIFICATIONS

Television System : PAL, SECAM - B/G REMOTE CONTROL SYSTEM

Receiving Channel :

System / Band	PAL SECAM B/G
VHF	2 - 12
UHF	21 - 69

Intermediate Frequency :

System / I-F Carrier Frequency	PAL SECAM B/G
Picture I-F Carrier	38.90
Sound I-F Carrier	33.40
Colour Sub Carrier	34.47

(Units:MHz)

Picture Tube : 29" A68KPS74X02/72YYB90X<P> diagonal measured, Quick-start, In-line-gun, Black stripe, 110° degrees deflection

Power Requirements : AC 230V, 50Hz, 125WATT

Antenna Input Impedance : VHF,UHF : 75 Ohm unbalanced type

Speaker : Impedance : 8 Ohm , 10W + 10W

Features : Voltage synthesized tuning System, On-screen Display, Auto-fine Tuning, Dark Tube, Auto Brightness Control, 53-Key Transmitter.

SAFETY CAUTION :

Before servicing this model, it is important that a service technician reads and follows the "Safety Precaution" and "Product Safety Notice" in this Service Manual.

* For continued X-radiation, replace the picture tube with original type.
* Design and specifications are subject to change without prior notice.
* WARNING-SHOCK HAZARDS - Use an isolation transformer when servicing.

TABLE OF CONTENTS

1. INSTRUCTION ---- 1
2. CHASSIS BLOCK DIAGRAM ---- 2
3. INSTALLATION AND SERVICE ADJUSTMENTS ---- 3 - 5
4. GENERAL ALIGNMENT INSTRUCTIONS
   1. Power Board Adjustment ---- 6 - 7
   2. Video Adjustment ---- 7 - 8
   3. Multi Sound Adjustment ---- 8
5. THE VOLTAGE AND THE CURRENT SUPPLY FLOWING DIAGRAM ---- 9
6. THE POWER UNIT BLOCK ---- 9
7. SMPS SECTION
   1. Block Diagram ---- 10
   2. Circuit Description ---- 10 - 11
   3. Power IC Specification (TDA4601/TDA4601D) ---- 12 - 13
   4. Transformer Connection Diagram ---- 14
   5. Switching TR (2SC3552) ---- 14
8. IF SECTION
   1. Block Diagram ---- 15
   2. TDA2549 Specification ---- 15 - 16
9. CHROMA & VIDEO SECTION
   1. Video Block Diagram ---- 17
   2. S60TOP AV, AV1, S-Video Switching Diagram ---- 18
   3. Semiconductor Specification
      1) Multistandard colour decoder (TDA4650) ---- 19 - 20
      2) 1H delay (TDA4660) ---- 20 - 21
      3) Colour transient improvement circuit (TDA4565) ---- 21 - 22
      4) Video control combination circuit (TDA3505) ---- 23 - 25
10. SOUND SECTION
   1. Sound Block Diagram ---- 26
   2. Quasi-Split Sound Processor (TDA3856/3866) ---- 27 - 30
   3. Integrated Filters and I^2C-bus Control (TDA8415) ---- 31 - 34
   4. Hi-Fi Stereo Audio Processor (TDA8425) ---- 35 - 37
   5. TA8200AH Specification ---- 38 - 39
11. DEFLECTION SECTION
   1. Vertical Section Block Diagram ---- 40 - 43
   2. Horizontal Section Block Diagram ---- 43
   3. Horizontal/Vertical Synchronization Circuit ---- 43 - 45
12. TELETEXT SECTION
   1. TTX Block Diagram ---- 46
   2. Semiconductor Specification ---- 46 - 51
13. μ-COM SECTION
   1. μ-Com Block Diagram ---- 52
   2. Semiconductor Specification (LA7910) ---- 53 - 54
   3. Remocon Section ---- 54
14. TROUBLESHOOTING CHARTS ---- 55 - 60
15. CHASSIS REPLACEMENT PARTS LIST ---- 61 - 71
16. EXPLODED VIEW ---- 72 - 73
17. SCHEMATIC DIAGRAM ---- 75

1. INSTRUCTION

1. IC LINE UP

NO	LOC. NO	SPECIFICATION	DESCRIPTION
1	IC101	TDA2549	PIF (PAL,SECAM)
2	IC604	TDA8425	Sound Control
3	IC602	TDA8415	Stereo Sound Processor
4	IC501	TDA4650/V3	Multi Standard Color Decoder
5	IC502	TDA4660	1H Delay
6	IC503	TDA4565	CTI (Color Transient Improvement Circuit)
7	IC201	TDA3505	Video Control Combination Circuit
8	TIC02	SAA5246P/E/SAA5246P/H	IVT (VIP and Teletext Decoder)
9	RIC01	SPM113-1	Tuning μ-com
10	RIC03	PCF8582/CAT24C02AP/X24C02P	EEPROM (Memory)
11	TIC01	PCB83C654P013	TTX. μ-com
12	TIC03	KM6264AL	S-RAM
13	TIC04	KS74HCTLS241	OSD or TTX R.G.B. F/B Switching
14	IC504	TC4053	S-Video Switching
15	IC505	TC4066	External Video Switching
16	IC603	TC4052	External Sound Switching
17	RIC04	LA7910	Band Selecter
18	IC601	TDA3856/TDA3866	SIF (PAL/SECAM-L)
19	IC401	TDA2579A	Sync Detector (Horiz, Vert)
20	IC801	TDA4601	SMPS Control
21	IC301	TDA3654	Vertical Deflection
22		SAA3010	Transmitter Control

2. MEANS OF COMPONENTS NUMBER SERIES

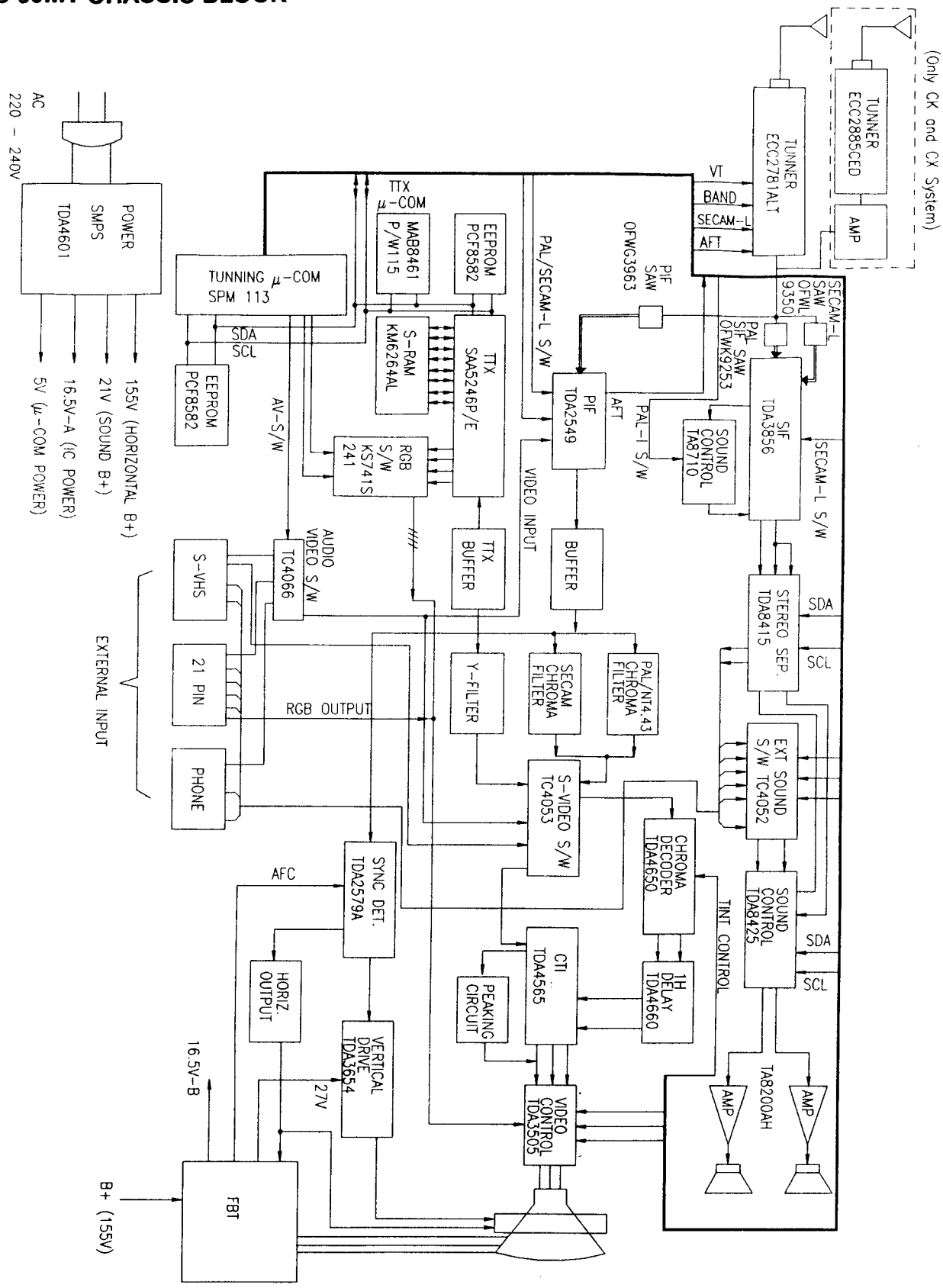
100 Series ----> TUNER/IF processing
200 Series ----> Video Luminance processing
300 Series ----> Vertical deflection
400 Series ----> Horizontal deflection/sync
500 Series ----> Chroma processing
600 Series ----> Sound processing
800 Series ----> AC input power supply circuits
RR, RQ, RC, RIC Series ----> Remocon processing
SR, SC, SQ Series ----> Switching
SCR, SCC, SCZ, SCQ Series ----> Sound converter
TR, TC, TIC, TQ Series ----> TTX processing

3. SPECIFICATION

Television System	PAL – B/G, SECAM – B/G		
Receiving Channel	VHF : 2 – 12, UHF : 21 – 69, CATV : S1 – S20		
Intermediate Frequency (MHz)	System / Carrier	PAL-B/G	SECAM-B/G
	Picture	38.9	38.9
	Color Sub	34.47	f_{OR} = 4.406 f_{OB} = 4.250
	Sound 1	33.4	33.4
	Sound 2	33.16	—
	Pilot	54.6873	—

2. CHASSIS BLOCK DIAGRAM

1. S-60MT CHASSIS BLOCK



3. INSTALLATION AND SERVICE ADJUSTMENTS

1. GENERAL INFORMATIONS

All the adjustments are throughly checked and corrected when the receiver leaves the factory. Therefore the receiver should operate normally and produce proper colours and B/W picture upon installation.
However, the minor service adjustments may be required depending on the particular location in which the receiver is operated. This receiver is shipped completely in carboard carton. Carefully draw out the carton and remove all the packing materials.
Plug the power cord into a convenient two pin power outlet. Turn the receiver on and adjust the fine tuning for the best picture detail.
Check and adjust all the customer controls such as brightness, contrast and colour controls to obtain natural colours or B/W picture.

2. AUTOMATIC DEGAUSSING

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussed upon installation. The degaussing coil operates for about 1 second after the power to the receiver is switched on. If the set is moved or faced in a different direction, the power switch must be switched off at least 10 minutes in order that the automatic degaussing circuit operates properly.
If the chassis or parts of the cabinet becomes magnetized and causes the poor colour purity, use an external degaussing coil. Slowly move the degaussing coil around the face-plate of the picture tube, the sides and the rear of the receiver and slowly withdraw the coil to the distance of about 2m before disconnecting it from the AC source. If the colour shading still persists, perform the colour purity adjustment and convergence adjustments procedures, as mentioned later.

3. HIGH VOLTAGE CHECK

Caution : There is no high voltage adjustment on this chassis. But B+ power must be adjusted in +155V under the full colour bar pattern and normal picture control level.

1) Connect an accurate high voltage meter to the second anode of the picture tube.
2) Turn on the receiver. Set the brightness and contrast controls to the minimum (zero beam).
3) The high voltage should be measured less than 27KV.
4) Rotate the brightness and contrast controls to the both extremes to be sure the high voltage does not exceed the 27KV limit under any conditions.

4. HORIZONTAL OSCILLATOR ADJUSTMENT

If there is an indication of unstable horizontal sync. adjust the horizontal hold control (VR401) to remove the condition. When you adjust the horizontal hold control, you should connect TPHG and TP-OSC for the H-oscillator adjustment.

5. HORIZONTAL PHASE ADJUSTMENT

If you want to move the center of picture, adjust horizontal phase control (VR402).

6. VERTICAL HEIGHT ADJUSTMENT

The size control (VR301) on the power board changes the size of the picture, having an equal effect on the top and the bottom.

7. BARREL ADJUSTMENT

The sidepincushion control (SVR02) on the power board changes the sidepincushion of the picture.

8. HORIZONTAL SIZE ADJUSTMENT

The horizontal size control (SVR01) on the power board changes the horizontal size of the picture.

9. SCREEN ADJUSTMENT

1) Tune in an active channel.
2) Make the picture be normal condition (no blooming or no flyback line) with the VR screen.

10. FOCUS ADJUSTMENT

Adjust the focus control on FBT for well defined scanning lines in the center area of the screen.

11. R-F AGC ADJUSTMENT

1) Tune the set in the strongest station in your area.
2) Turn the AGC control (VR101) on the IF board to fully clockwise position.
3) Adjust the AGC control until the noises (snow) disappear from the screen.

12. APC ADJUSTMENT

1) Receive the colour bar pattern.
2) Connect TP17 to GND with jumper.
3) Control the Trimer C545 on the main PCB to get the colour.

13. COLOUR PURITY ADJUSTMENT

Note : Before attempting any purity adjustments, the receiver should be operated for at least fifteen minutes. Purity adjustment requires a rubber wedge kit.

1) Demagnetize the picture tube and cabinet using a degaussing coil.
2) Turn the contrast and brightness controls to the maximum.
3) Receiver the green colour pattern.
4) Loosen the clamp screw holding the yoke, and slide the yoke backward or forward to provide vertical green belt (zone) in the picture screen.
5) Remote the rubber wedges.
6) Rotate and spread the tabs of the purity magnet (See Fig. 3) around the neck of the picture tube until a green belt is obtained in the center of the screen.
7) Move the yoke slowly forward or backward until a uniform red screen is obtained. Tighten the clamp screw.
8) Check the purity of the red and blue rasters.
9) Tighten the clamp screw of the yoke temporarily.
10) Obtain a white raster : refferring to the "CRT WHITE BALANCE ADJUSTMENT".
11) Proceed with convergence adjustment.

14. CRT WHITE BALANCE ADJUSTMENT

1) Tune in an active channel.
2) Set the colour control to the minimum.
3) By rotations the red and the blue drive controls (VR201, VR202) clockwise from the minimum, set them tothe mid-position.
4) Adjust the blue and the red drive controls (VR201, VR202) to obtain proper white-balanced picture in a high area.

15. CONVERGENCE ADJUSTMENT

Note : Before attempting any convergence adjustment, the receiver should be operated for at least fifteen minutes.

A. Centre Convergence Adjustment

1) Receive the crosshatch pattern with a colour bar signal generator.
2) Adjust the brightness and the contrast controls for a well defined pattern.
3) Adjust the two tabs of the 4-pole magnets to change the angle between them (See Fig. 2) and superimpose the red and the blue vertical lines in the centre area of the picture screen (See Fig. 2).
4) Turn the both tabs while at the same time keeping the angle constant and superimpose the red and the blue horizontal lines at the center of the screen (See Fig. 3).
5) Adjust the two tabs of 6-pole magnets to superimpose the red, the blue and the green ones. Adjusting the angle affects the vertical lines and rotating both magnets affect the horizontal lines.
6) Due to the interaction between these adjustments the steps 3, 4 and 5 should be repeated until the satisfactory results are obtained.

B. Circumference Convergence Adjustment

1) Loosen the clamping screw of deflection yoke to allow the yoke to tilt.
2) Put a wedge as shown in Fig. 1 temporarily (Do not remove the cover paper on adhesive part of the wedge).
3) Tilt the front of the deflection yoke up or down to obtain better convergence in circumference (See Fig. 3). Push the mounted wedge into the space between the picture tube and the yoke to fix the yoke temporarily.
4) Put the other wedge into bottom space and remove the cover paper to stick.
5) Tilt the front of the yoke right or left to obtain the convergence in circumference (See Fig. 4).
6) Keep the yoke position and put another wedge in either upper space. Remove the cover paper and stick the wedge on picture tube to fix the yoke.
7) Detach the temporarily mounted wedge and put it in another upper space. Stick it on picture tube to fix the yoke.
8) After fixing three wedges, recheck overall convergence. Tighten the screw firmly to fix the yoke and check if the yoke is firm.
9) Stick 3 adhesive tabs on the wedges as shown in Fig. 1.

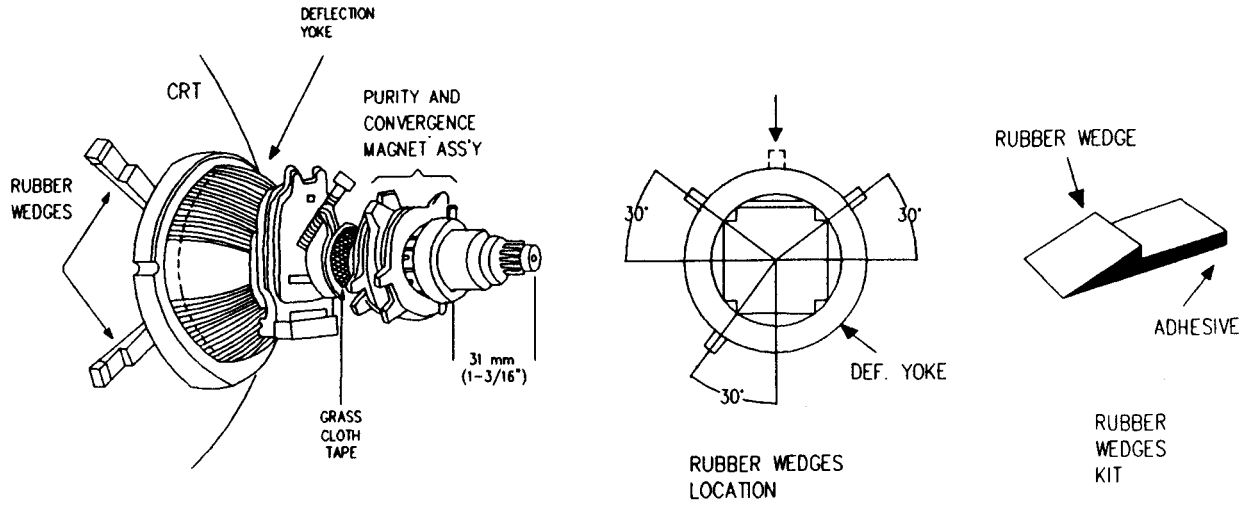


Figure 1. TUBE ASSEMBLY

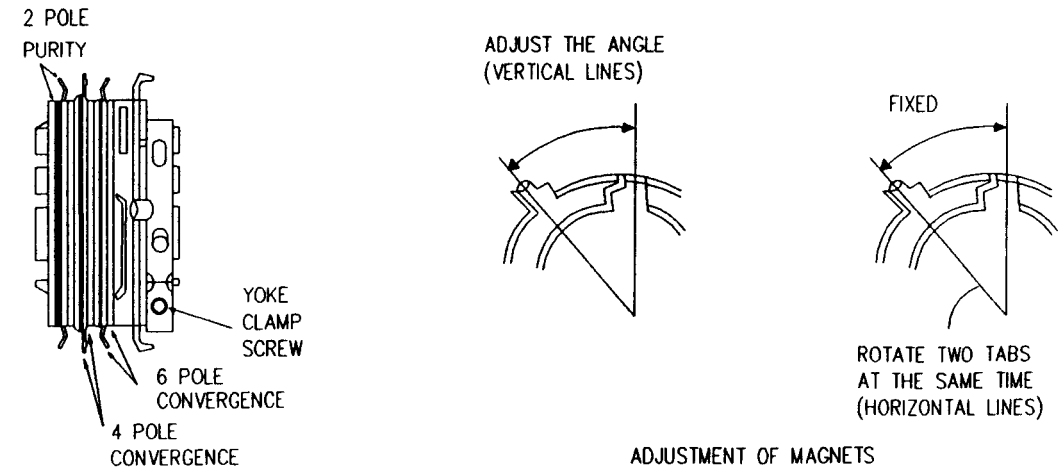


Figure 2. PURITY AND CONVERGENCE MAGNETS

Centre Convergence by Magnets

Circumference Convergence by DEF. Yoke

Figure 3. Dot Movement Instructions

4. GENERAL ALIGNMENT INSTRUCTIONS

A. GENERAL

The alignment is an exacting procedure and should be undertaken only when necessary.
The test equipment specified or its equivalent is required to properly perform the alignment procedures which are outlined on the following pages. The use of equipment which does not meet these requirements may result in the inability of proper aligning in the receiver.
It is essential that bias values as specified are maintained, while the alignment insures the proper results.

B. EQUIPMENT TERMINATIONS

The alignment pads are designed for correct matching of the equipment to the circuits involved. The failure of the proper matching will result in the responses which cannot be depended upon as representing the ture operation of the receiver. The pads should be constructed as compactly as possible with all the unshielded leads not being in excess of 2.5cm long.

C. SIGNAL OVERLOAD

Since the large excessive of the sweep generator causes the overloading of receiver circuits, first, the output of the sweep generator set to zero and then gradually increase the output until a response is obtained. Further, increase of the sweep output should not change the configuration of the response except in amplitude. If the response changes in configuration, for example, flatting at the top or dropping below the base line at the bottom, decrease the sweep output to restore the proper configuration. The oscilloscope gain should be as high as possible to maintain the useable pattern with peak-to-peak values specified, thus requiring a lower output from the sweep generator and less change of overload.
The insertion of markers from the marker generator should not cause the distortion of the response.

D. TEST EQUIPMENTS

1) PAL/SECAM PATTERN GENERATOR (PM5518)
2) OSCILLOSCOPE
3) DC POWER SUPPLY (DC RANGE : 0 - 10V, 0 - 20V)
4) MATCHING PAD
5) PROBE (WHICH IMPEDANCE IS 75 OHM)
6) TV MULTI SOUND GENERATOR
7) BNC TO DIN JACK
8) BNC TO BNC CABLE
9) DIGITAL VOLTMETER

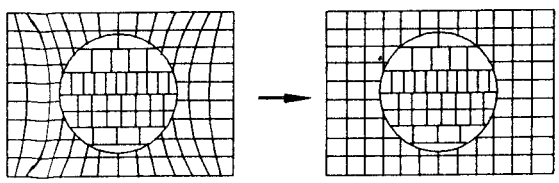
1. POWER BOARD ADJUSTMENT

B + (155V) Adjustment

1. Lion-Head Pattern Picture - Reception.
2. The digital meter is put onto the DC 220V range, and the + part of the probe is put onto the TP155-1 and the – part of the probe is put onto the TP-GND.
3. The B + potential controls to be 155V with VR801 adjustment.

Barrel Adjustment

1. Philips Pattern Picture - Reception.
2. Through the SVR02 is adjusted, just like the following below figure is adjusted.



Horizontal Size Adjustment

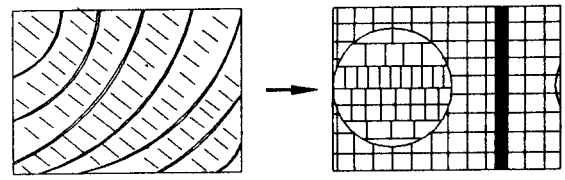
1. Lion-Head Pattern Picture - Reception.
2. Through the SVR01 is adjusted, the picture size controls to be 5.5 at both of parts.

Vertical Size

1. Lion-Head Pattern Picture - Reception.
2. Through the VR301 is adjusted, the verticao size controls to be 4 in all the top and the bottom.

H-Holder Adjustment

1. Philips Pattern Picture - Reception.
2. The TP-OSC and the TP-HG must be shorted.
3. It matches just like the below figure with VR401 adjustment.



H-Phase Adjustment

1. Philips Pattern Picture - Reception.
2. The electric horizontal center of the CRT and the center of the philips pattern are controlled rightly with VR402 adjustment.

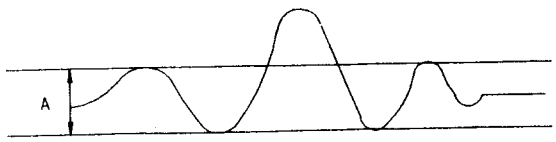
Screen Voltage Adjustment

1. Philips Pattern Picture - Reception.
2. It uses and controls the probe over 100MΩ.
3. The + part of the probe connects to the screen pin of the CRT PCB and the – part of the probe connects to the GND.
4. The voltage of the digital meter machine controls to be DC 600V with the screen VR adjustment of the FBT.

2. VIDEO ADJUSTMENT

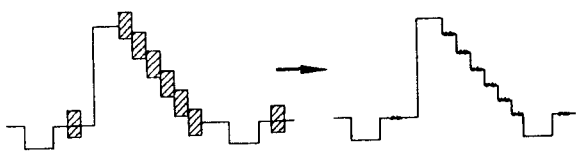
PIF Detector Adjustment

1. The PM5518 sets the multi burst pattern of 38.9 MHz (PAL - B/G).
2. Connect the oscilloscope probe to TP-11 of the main PCB.
3. Adjust T102 to equalize the 'A' level.



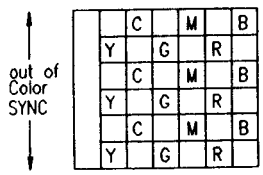
Chroma Trap Adjustment

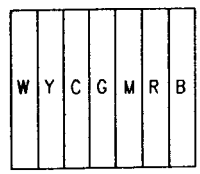
1. Receive the color bar pattern with PAL generator.
2. Connect the oscilloscope probe to TP-Y of the main PCB.
3. Adjust L251 until the chroma signal is disappeared.



APC Adjustment

1. Receive the color bar pattern with PAL pattern generator.
2. Connect TP-17 of the main PCB to the GND with jumper.
3. Adjust C545 until the color bar pattern stands still vertically or drifts slowly across the picture screen.



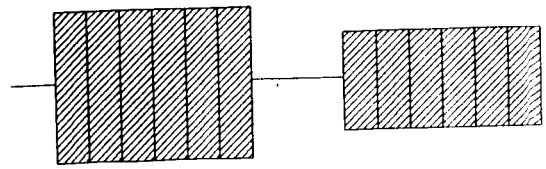


AFT Adjustment

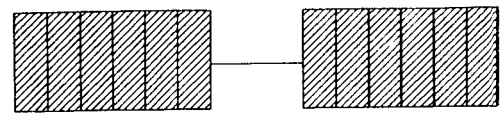
1. The PM5518 sets the multi burst pattern of 38.9 MHz (PAL - B/G).
2. Connect the oscilloscope probe to TP-AFT of the main PCB.
3. Adjust T101 until the digital voltmeter is to be 6V.

Bell Filter Adjustment

1. Receive the SECAM color bar signals.
2. Connect the oscilloscope probe to the terminal TP-23.



(Improper Adjustment)

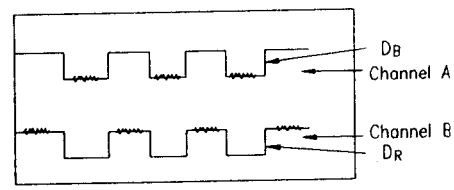


(Proper Adjustment)

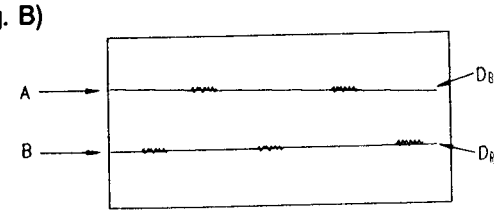
DR. DB Adjustment

1. The PM5518 sets SECAM gray scale pattern.
2. Connect the oscilloscope of A channel probe to the terminal TP-DB and the oscilloscope of B channel probe to the terminal TP-DR.
3. Adjust L501, VR502 until the figure A of square wave is to be flat level.

(Fig. A)

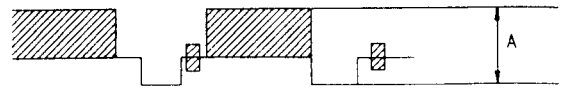


(Fig. B)



SECAM-L, Video Gain Adjustment

1. Receive the SECAM-L Philips pattern.
2. Connect the oscilloscope probe to the terminal of TP-13.
3. Adjust VR120 until the amplitude of 'A' is to be 2V.



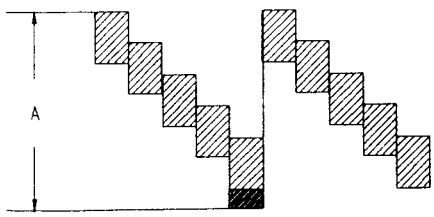
White Balance Adjustment

1. Adjust VR201, VR202 until the picture screen is to be proper white.

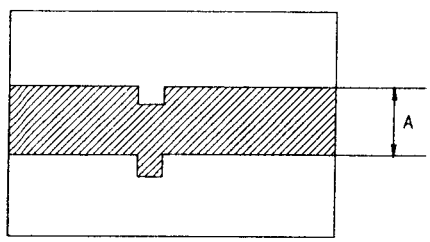
3. MULTISOUND ADJUSTMENT

PAL SIF Detector Adjustment

1. Receive the color bar signal and mono sound (PAL - B/G).
2. Connect the oscilloscope probe to the terminal TP-SC.
3. Adjust T601 until the amplitude 'A' of the color bar is the minimum (See Figure).



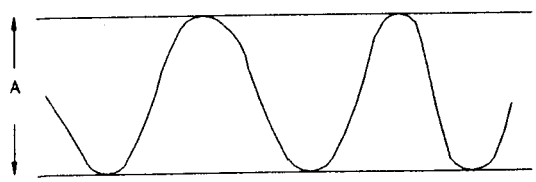
(Before the adjustment)



(After the adjustment)

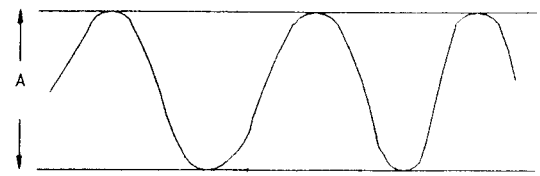
AF1 Sound Detector Adjustment

1. Receive the color bar signal and mono sound (1 KHz).
2. Connect the oscilloscope probe to the terminal TP-AF1.
3. Adjust T602 until the amplitude A is the maximum.



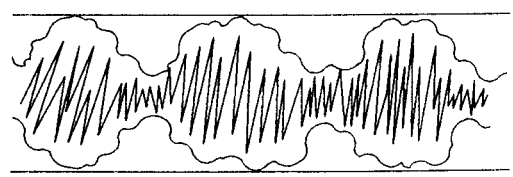
AF2 Stereo Sound Adjustment

1. Receive the color bar signal and stereo sound (PAL - B/G).
   (The AF1 is 3KHz.
   \ The AF2 is 1KHz.
2. Connect the oscilloscope probe to the terminal TP-AF2.
3. Adjust T602 until the amplitude A is the maximum.

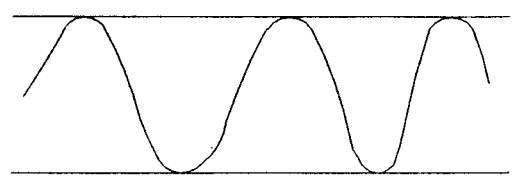


Stereo Sound Separation Adjustment

1. Receive the color bar signal and stereo sound (PAL - B/G).
   (The left sound is 3KHz.
   \ The right sound is 1KHz.
2. Connect the oscilloscope probe to the terminal TP-L.
3. Connect the oscilloscope probe to the terminal TP-R.
4. Adjust VR601 not to be the distortion of R,L signal.

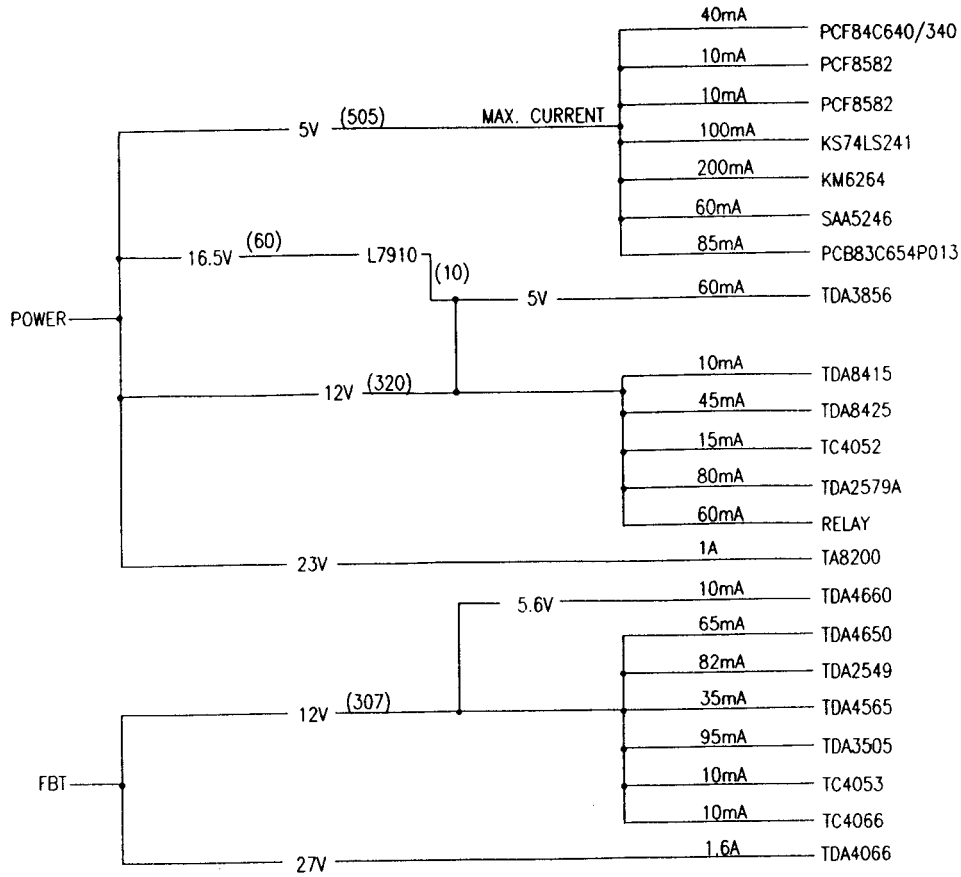


(Before the adjustment)

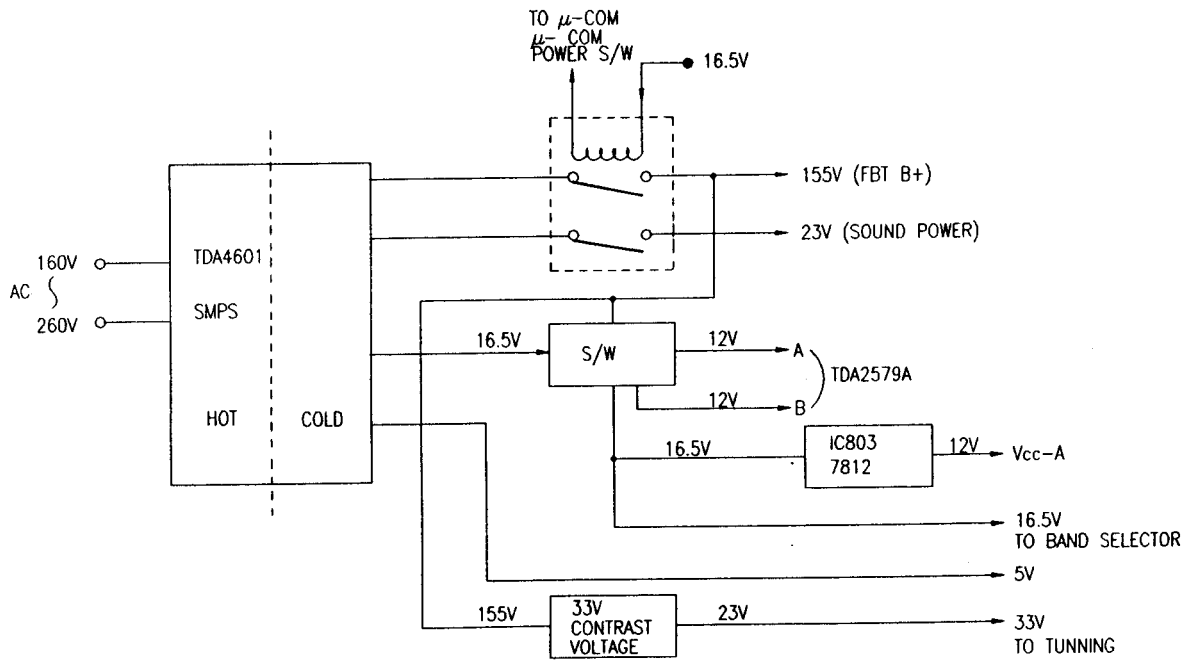


(After the adjustment)

5. THE VOLTAGE AND THE CURRENT SUPPLY FLOWING DIAGRAM

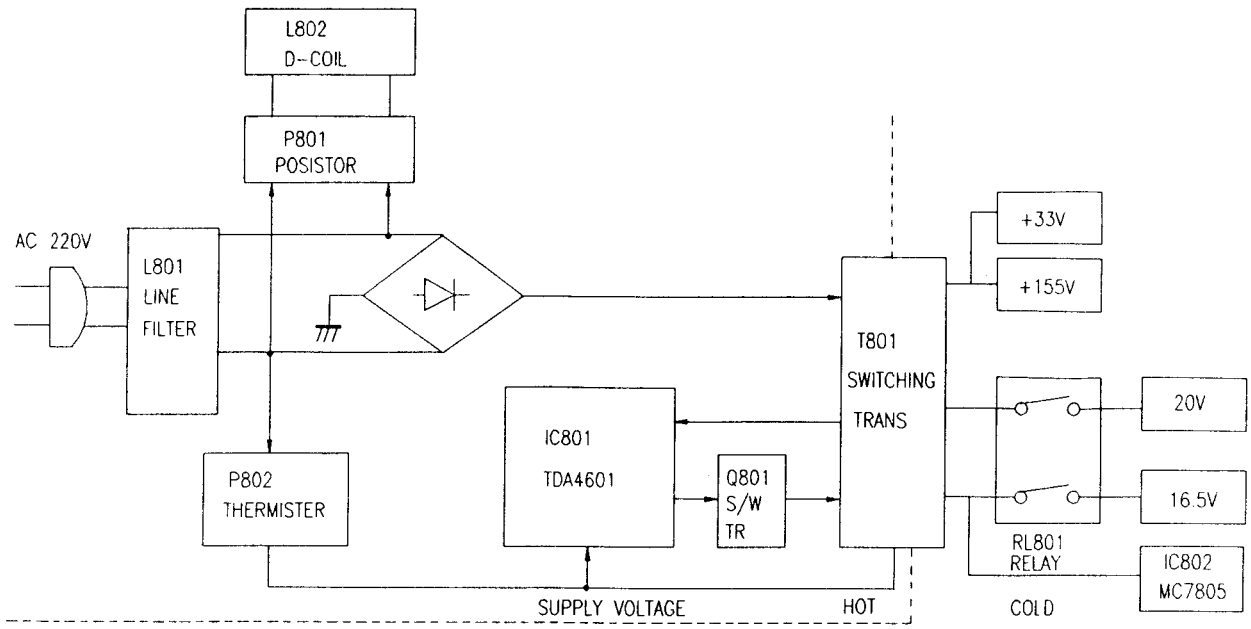


6. THE POWER UNIT BLOCK



7. SMPS (SWITCH MODE POWER SUPPLY) SECTION

1. BLOCK DIAGRAM



2. CIRCUIT DESCRIPTION

The TDA4601 has been designed for driving, controlling, and protecting the switching transistor in blocking converter power supplies during start-up, normal, and overload operatings as well as during interferences. In case of interferences, the drive of the switching transistor is inhibited and a secondary voltage rise is prevented.

- Direct control of the switching transistor.
- Low start-up current.
- Reverse linear overload characteristic.
- Base current drive proportional to connector current.
- Protective circuit for case of interferences.

Start-up

The start-up procedures (ON mode) include three consecutive operating phases as follows :

1. Build-up of the internal reference voltage.
   The internal reference voltage supplies the voltage regulator and effects the charging of the coupling electrolytic capacitor connected to the switching transistor. The current consumption will remain at $I_9 < 3.2mA$ with a supply voltage up to $V_9 \approx 12V$.
2. Enabling the internal voltage - reference voltage
   $V_1 = 4V$
   Simultaneous with V_9 reaching $\approx$ 12V, and internal voltage becomes available, providing all component elements, with the exception of the control logic, with thermally stable and overload resistant current supply
3. Enabling the control logic
   In conjunction with the generation of the reference voltage, the current supply for the control logic is activated by means of an additional stabilization circuit. The integrated circuit is now ready operation.

The above described start-up phases are necessary for ensuring the charging of the coupling electrolytic capacitor which in turn supplies the switching transistor. Only then it is possible to ensure that the transistor switches accurately.

Normal operating mode/control operating mode

At the input of pin 2 the zero crossings of the frequency provided by the feedback coil are registered and forwarded to the control logic. Pin 3 (control input, overload and "stanby" recognition) receives the rectified amplitude fluctuations of the feedback coil. The regulating amplifier operates with an input voltage of approx. 2V and a current of approx. 1.4mA.
Depending on the internal reference voltage, the overload recognition limits in conjunction with the collector current simulator pin 4 the operating range of the control amplifier. The collector current is simulated by an external RC combination present at pin 4 and internally set threshold voltages. The largest possible collector current applicable with the switching transistor (point of return) increases in proportion to the increased capacitance (10μF). Thus the required operating range of the control amplifier is established. The range of control lies between a DC voltage clamped at 2V and a sawtooth-shaped rising AC voltage, which can vary up to a max. amplitude of 4V (reference voltage).

During the secondary load decreases to approx. 20 Watt, the switching frequency is increased ($\sim$ 50 kHz) at an almost constant pulse duty factor (1:3). During the additional secondary load decreases to approx. 1 Watt, the switching frequency increases to approx. 70 KHz and the pulse duty factor to approx. 1:11.
At the same time, the collector peak current is reduced to <1A.

The output levels of the control amplifier as well as those of the overload recognition and the collector current simulator are compared in the trigger and forwarded to the control logic. Via pin 5 it is possible to externally inhibit the operations of the IC. The output at pin 8 will be inhibited when the voltages of $\leq \frac{Vref}{2}$ - 0.1V are present at pin 5.

Flip flops for controlling the base current amplifier and the base current shut-down are set in the control logic depending on the start-up circuit, the zero crossing identification as well as the release through the trigger. The base current amplifier forwards the sawtooth-shaped V_4 voltage to the output of pin 8. A current feedback with an external resistor (R = 0.68Ω) is present between pin 8 and pin 7. The applied value of the resistor determines the max. amplitude of the base driving current for the switching transistor.

Protective operating mode

The base current shut-down activated by the control logic clamps the output of pin 7 to 1.6V. As a result, the drive of the switching transistor is inhibited. This protective measure is enabled if the supply voltage at pin 9 reaches $\leq$ 6.7V or if voltages of $\frac{Vref}{2}$ - 0.1V are present at pin 5. In case of short-circuits occuring in the secondary outputs of the switching power supply, the integrated circuit continuously monitors the fault conditions. During the secondary, completely load-free operations, only a small pulse duty factor is set. As a result, the total current consumption of the power supply is held at N = 6...10 Watt during both operating modes. After the output has been inhibited during a voltage supply of $\leq$ 6.7V, the reference voltage (4V) is switched-off, if the voltage supply is further reduced to ΔV_9 = 0.6V.

Protective operating mode at pin 5 during interferences

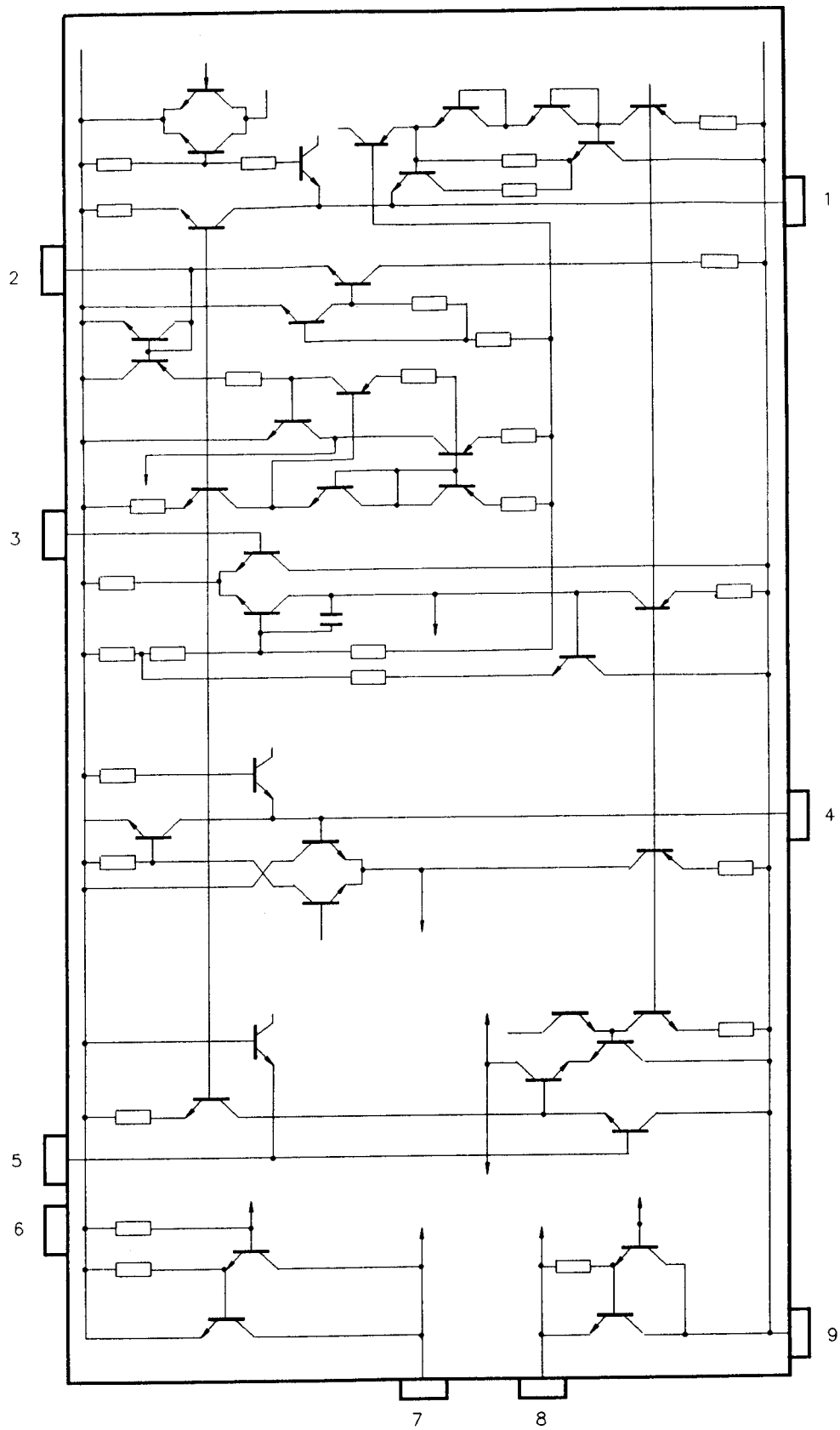
The protection against interferences such as primary undervoltages and/or secondary overvoltages (e.g. by charging the component parameters for the switching power supply unit) is realized as follows :

In case of interferences, the output pulses at pin 8 are inhibited by falling below the protective threshold V_5 having a typical value of $V_1/2$. As a result, the current consumption is reduced ($I_9 \geq$ 14mA at V_9 = 10V).
By applying a corresponding start-up resistor, the supply voltage V_9 will fall below the minimal shut-down threshold (5.7V) for the reference voltage V_1. The V_1 will be switched off and the current consumption is further reduced to $I_9 \leq$ 3.2mA at $V_9 \leq$ 10V.

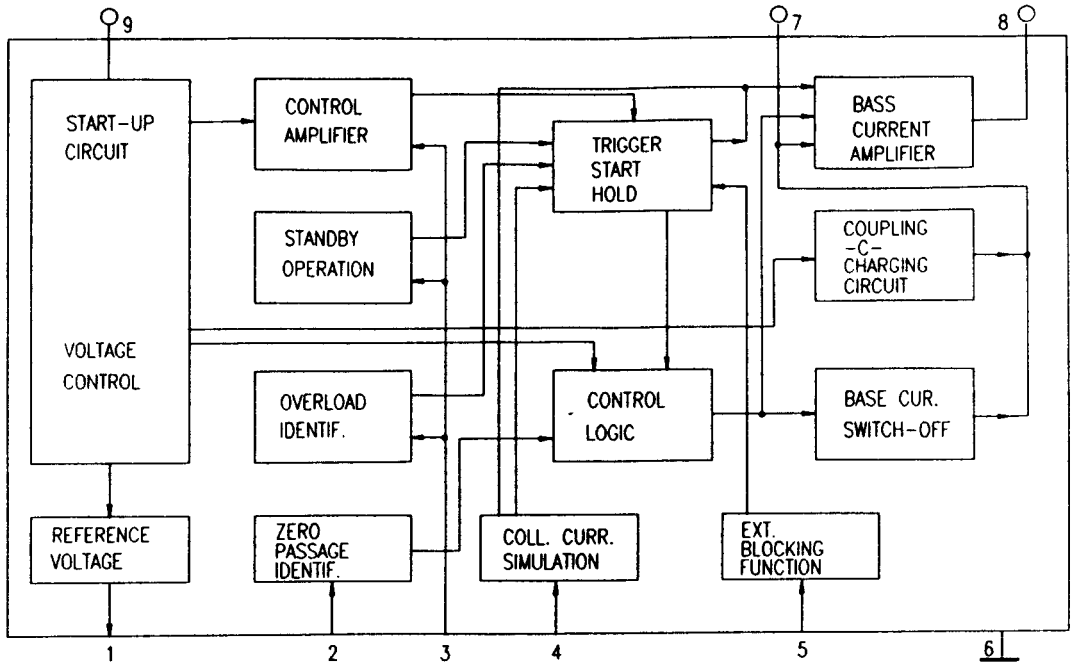
Because of these reductions in current consumption, the supply voltage can rise again to reach the switch-on threshold of $V_9 \geq$ 12.3V. The protective threshold at pin 5 is released and the power supply unit is operable again.
In case of continuing problems of interference ($V_5 \leq V_1/2$ - 0.1V) the switch-on mode is interrupted by the above described periodic protective operating mode, that is to say, pin 9 is inhibited and V_9 is falling, etc.

3. POWER IC SPECIFICATION (TDA4601/TDA4601D)

Pin Connection Diagram



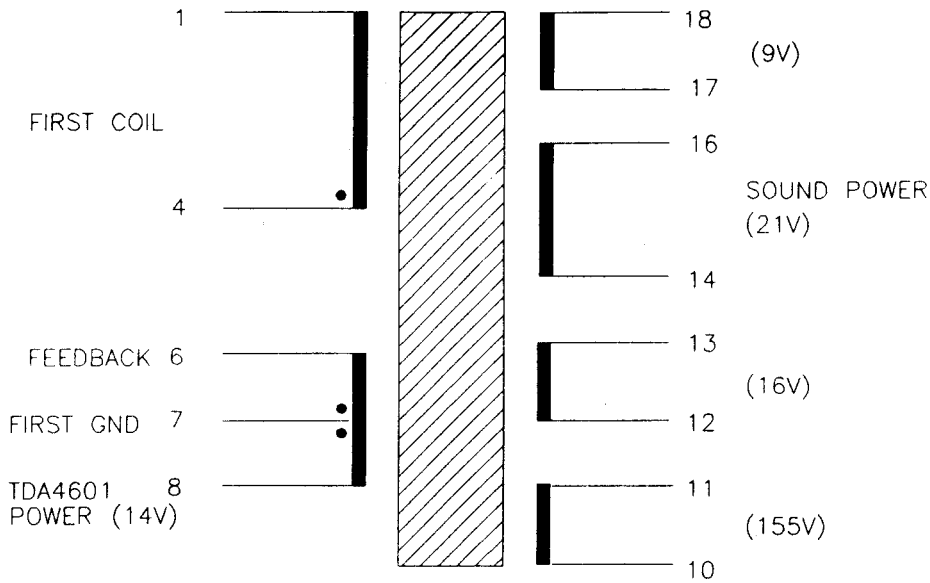
TDA4601 IC Block Diagram



Pin Function and Ratings

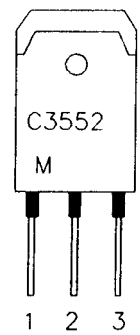
Pin No	Parameter	Voltage			Unit	Current			Unit
		Min.	Typ.	Max.		Min.	Typ.	Max.	
1	Reference output	4	4.2	6	V				
2	Identification input	-0.2		0.2	V			±3	mA
3	Controlled amplifier	2.3	2.6	2.9	V			±3	mA
4	Collector current simulation voltage	1.8	2.2	2.5	V			5	mA
5	External protection threshold	6	7	8	V			5	mA
6	GND								
7	DC output	2.7	3.3	40	V			1.5	A
8	Pulse output driving of the switching	2.7	3.4	4.0	V			-1.5	A
9	Operating supply voltage	7.8		18	V	110	135	160	mA

4. TANSFORMER CONNECTION DIAGRAM



5. SWITCHING TR (2SC3552)

Absolute maximum Ratings (Ta=25°C)		Symbol	Min.	Typ.	Max.	unit
Collector to Base voltage		V_{CBO}		1100		V
Collector to Emitter voltage		V_{CEO}		800		V
Emitter to Base voltage		V_{EBO}		7		V
Collector current		Ic		12		A
Peak collector current		icp		30		A
Base current		I_B		6		A
Collector dissipation		Pc		150		W
Turn on time		ton			0.5	μs
Storage time		tstg			3.0	μs
Fall time		tf			0.3	μs
hfe	Ic : 4A			8		
	Ic : 0.8A			10		



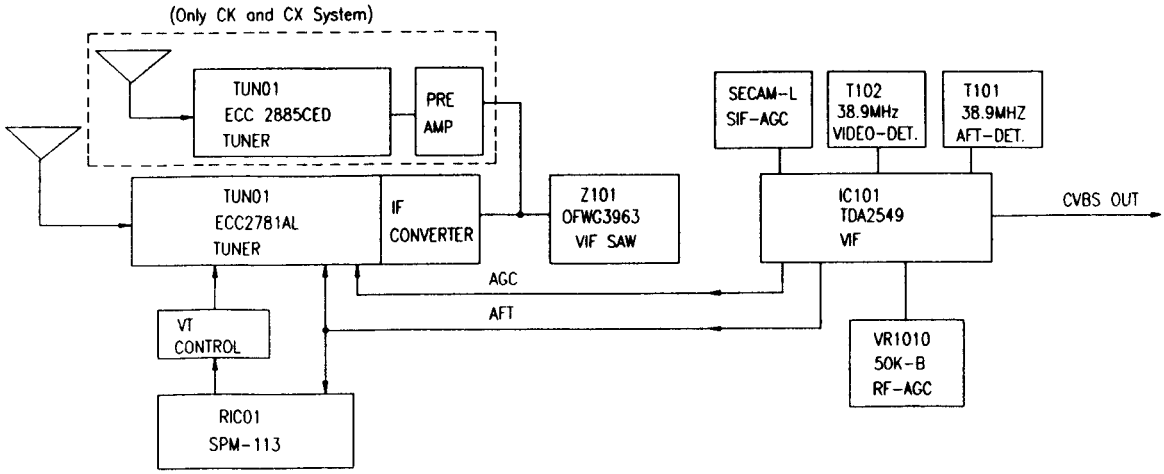
1 : Base

2 : Collector

3 : Emitter

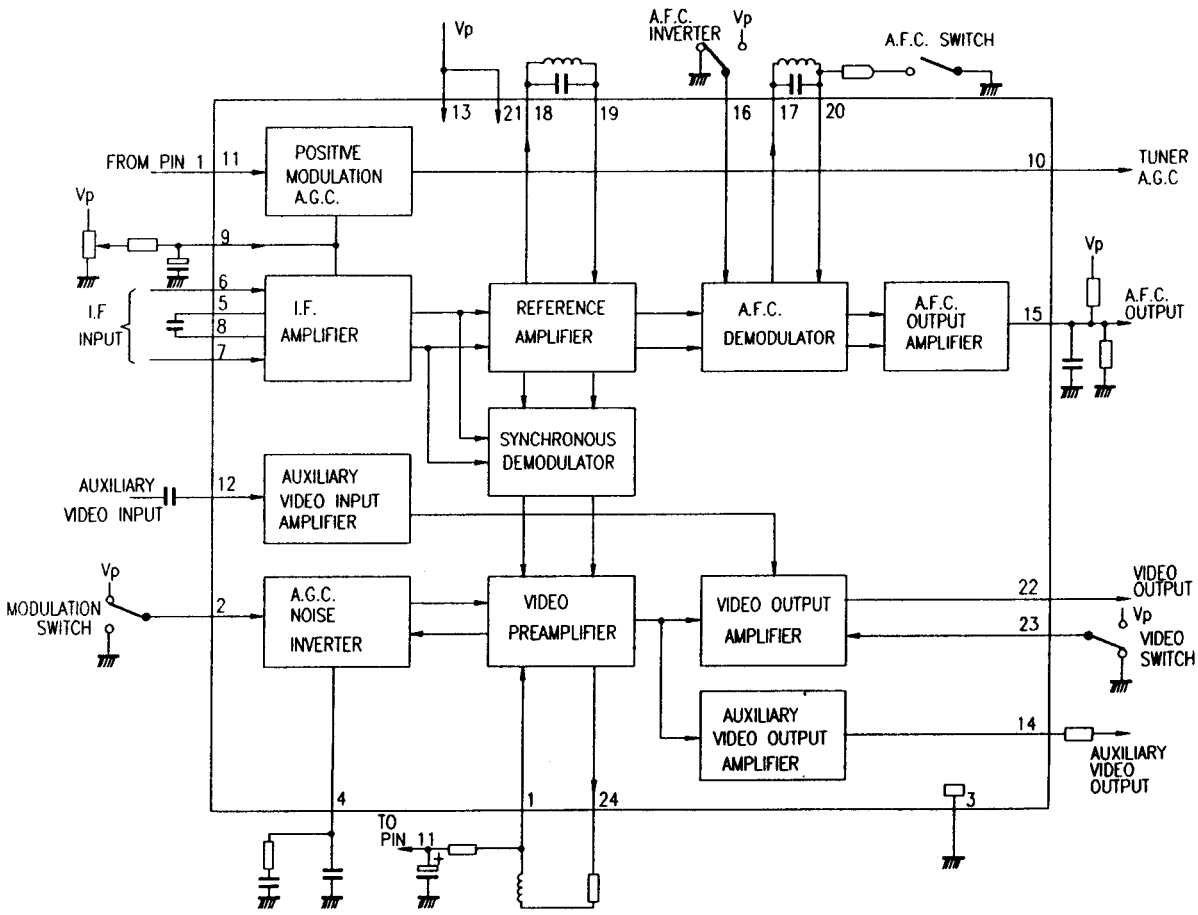
8. IF SECTION

1. BLOCK DIAGRAM



2. TDA2549 SPECIFICATION

TDA2549 Block Diagram



TDA2549 Pin Description

Pin	Description	Pin	Description
1	Video preamplifier output	13	Main supply voltage
2	Modulation switch	14	Auxiliary video output
3	Ground	15	AFC output
4	Top sync detector (noise inverter AGC)	16	AFC inverter switch
5	Feedback decoupling IF amplifier	17	AFC demodulator
6	IF input	18	Synchronous demodulator, reference amplifier
7	IF input	19	Synchronous demodulator, reference amplifier
8	Feedback decoupling IF amplifier	20	AFC switch
9	Tuner AGC take-over point	21	Main supply voltage
10	Tuner AGC output	22	Video output
11	Mean level detector (AGC)	23	Video switch
12	Auxiliary video input	24	Video preamplifier input

TDA2549 Subject

Parameter		Conditions	Symbol	Min.	Typ.	Max.	Unit
Supply voltage			Vcc	10.8	12	13.2	V
Supply current			Ip	–	82	–	mA
IF input signal		V0 = 2V	Vi = V6-7	–	50	150	mV
IF gain ontrol range			GV	50	74	–	dB
Video output voltage Peak-to-peak value	Positive modulation Negative modulation	Vi = 0V Vi = 0V	V22-3 V22-3	1.6 3.7	2 4	2.3 4.3	V V
Signal-to-noise ratio		Vi = 10mV	S/(S+N)	50	57	–	dB
AFC output voltage swing			V15-3	10			V
Max. tuner AGC output current			I10	0.3			mA
Video bandwidth		3dB	B		5.5		MHz
Auxiliary video input voltage (peak-to-peak value)		V0 = 2V	V12-3(p-p)	0.7	1	1.4	V
Auxiliary video output voltage			V14-3	1	2	3	V

General Description

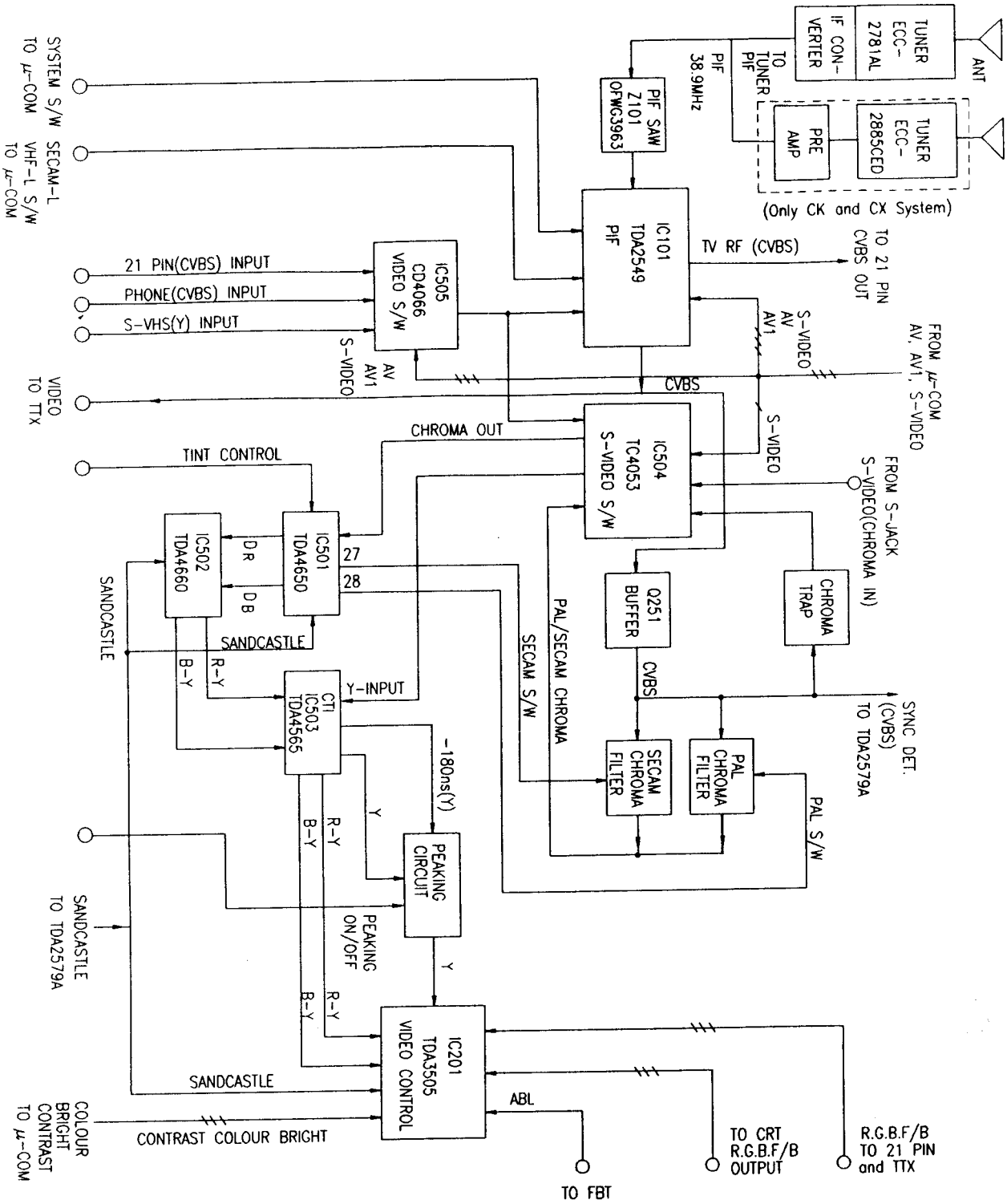
The TDA2549 is a complete IF circuit with AFC, AGC, demodulation and video preamplification facilities for multistandard television receivers. It is capable of handling positively and negatively modulated video signals in both colour and black/white receivers.

*** Features :**

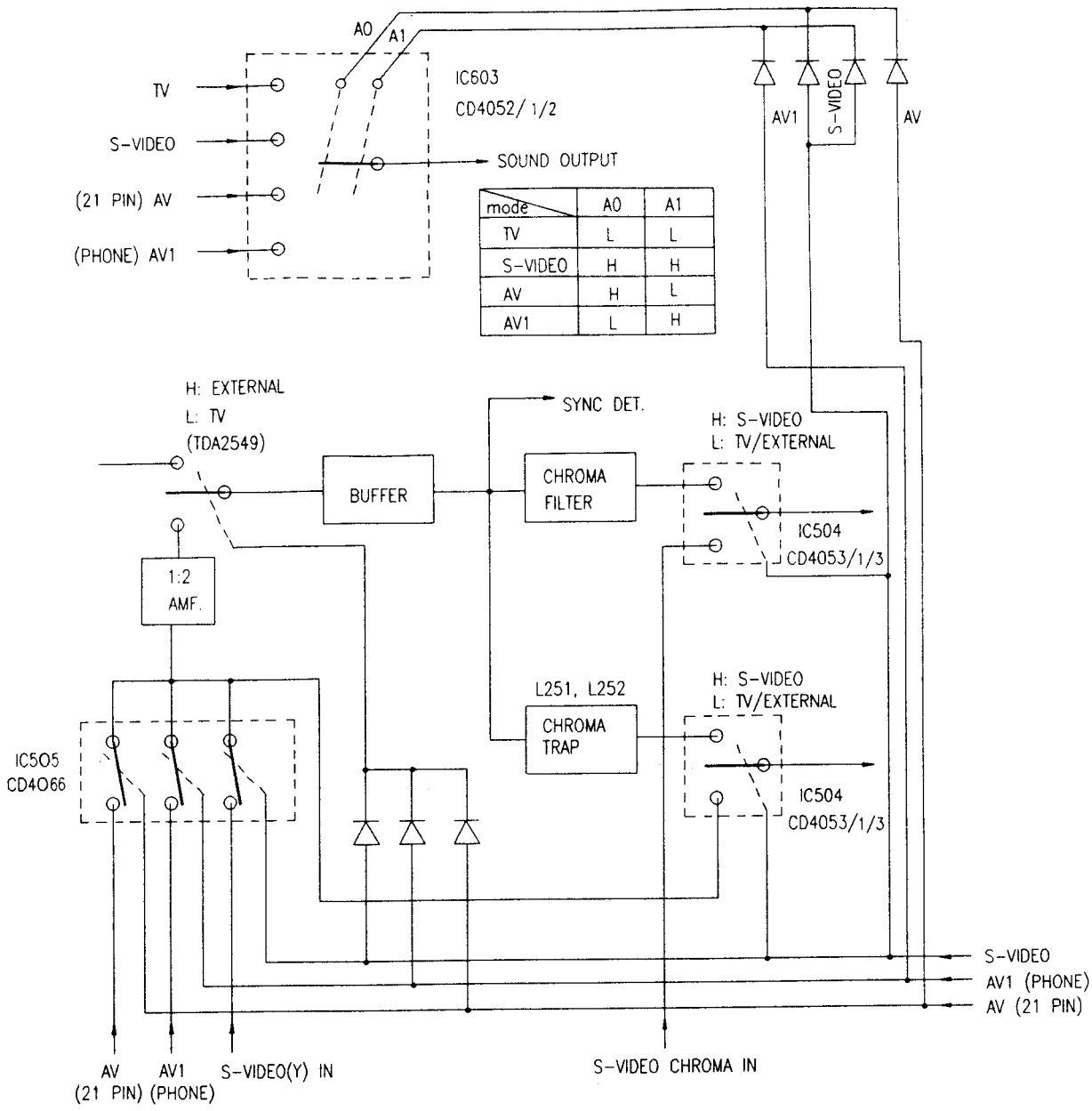
- Gain-controlled wide-band amplifier providing complete IF gain
- Synchronous demodulator for positive and negative modulation
- Video preamplifier with noise protection for negative modulation
- Auxiliary video input and output (75Ω)
- Video switch to select between auxiliary video input signal and demodulated video signal
- AFC circuit with on/off switch and inverter switch
- AGC circuit for positive modulation (mean level) and negative modulation (noise gate)
- AGC output for controlling MOSFET tuners

9. CHROMA & VIDEO SECTION

1. VIDEO BLOCK DIAGRAM



2. S60TOP AV, AV1 S-VIDEO SWITCHING DIAGRAM



mode	A0	A1
TV	L	L
S-VIDEO	H	H
AV	H	L
AV1	L	H

3. SEMICONDUCTOR SPECIFICATION

1) Multistandard Colour Decoder (TDA4650)

a. General description

The TDA4650 is a monolithic integrated multistandard colour decoder for PAL, SECAM, NTSC 3.58MHz and NTSC 4.43MHz standards with negative colour difference output signals. It is prepared for a followed switch capacitor delay line TDA4650.

b. Feature

Chrominance part

- Gain controlled chrominance amplifier for all standards.
- ACC rectifier circuits controlled by system scanning.
- Burst blanking stage for PAL and NTSC.

Demodulator part

- PAL/NTSC :
  Quadrature demodulator with a colour subcarrier reference. PAL switching stage (disabled for NTSC) phase shifting stage (disabled for PAL).
- SECAM :
  Limitter for SECAM signal. Quadrature modulator with one external reference circuit clamping stage for blanked line and line/field playback deemphasis.
- Internal filtering of residual subcarrier and output stages with low impedance controlled by system recognizing and colour killer stage.

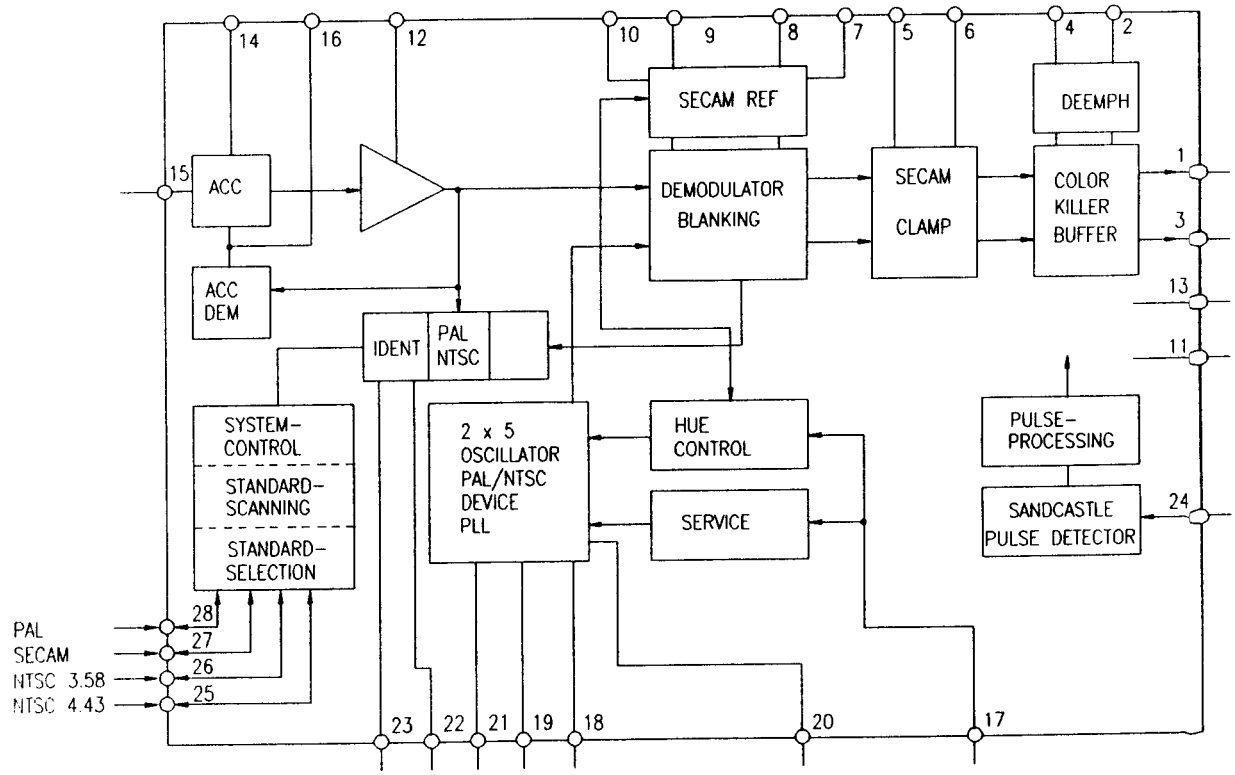
Identification part

- Automatic standard recognition by sequential inquiry.
- Delay for colour and scanning on.
- Reliable SECAM identification by PAL priority and 50/60Hz recognition (SECAM).
- Four switching voltages output stages for chrominance filter and display.
- Force switch-on of every standard.
- H-identification for SECAM.
- One pin for each crystal oscillator(internal switching).
- Chromatic correction for NTSC(HUE control).
- Service switching for oscillator free run and colour on.

c. Quick reference Data

Parameter	Symbol	Min.	Typ.	Max.	Unit
supply voltage	Vcc	10.8	12	13.2	V
supply current	Ip	—	65	—	mA
chrominance input voltage (peak-to-peak value)	V15-11	20	100	400	mV
colour diff. output voltage PAL/NTSC (peak-to-peak value)	V1-11	0.42	0.535	0.66	V
	V3-11	0.53	0.675	0.84	V
colour diff. output voltage SECAM (peak-to-peak value)	V1-11	0.83	1.05	1.32	V
	V3-11	1.06	1.33	1.67	V

d. Blcok Diagram



e. Pin Description

Pin	Description	Pin	Description
1	R-Y output	15	Chroma input
2	B-Y deemphasis	16	AGC
3	B-Y output	17	HUE-control
4	R-Y deemphasis	18	PLL
5	B-Y clamping	19	7.15MHz oscillator
6	R-Y clamping	20	PLL DC
7	SECAM reference circuit	21	8.86MHz oscillator
8	"	22	NTSC identification
9	"	23	PAL/SECAM identification
10	"	24	Sandcastle
11	Ground	25	NTSC 4.43MHz recognize output
12	DC for demodulators	26	NTSC 3.58MHz recognize output
13	Supply voltage	27	SECAM recognize output
14	DC feedback	28	PAL recognize output

2) 1H Delay (TDA4660)

a. General Description

The TDA4660 is a monolithic integrated baseband delay line circuit of 64μs for color difference signals.

The IC consists of two main blocks

-. 2 comb filters with a delay time of 64μs in switched capacitor technique.

-. Internal clock generation of 3MHz which is the line locked via the sandcastle pulse.

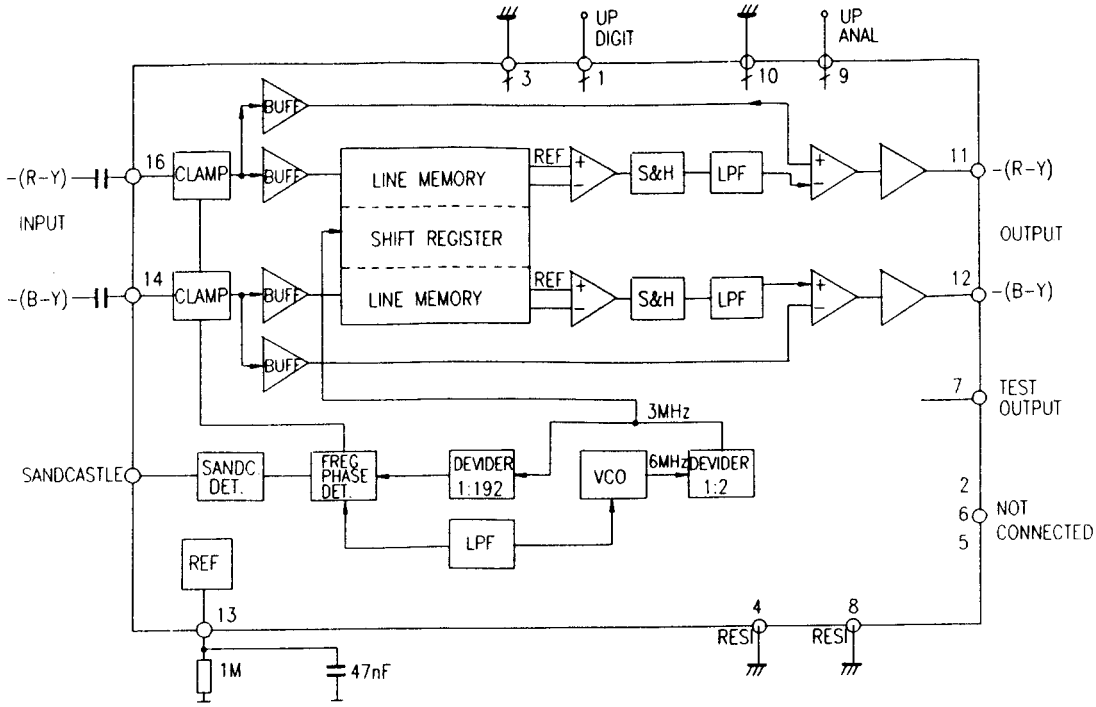
- The colour difference-signals (R-Y, B-Y) are capacitively coupled to the pins 16/14 and clamped in the input stages.
  The signals then are fed via a buffer to the delay lines which are driven by an internal clock of 3MHz to get a delay time of 64μs.
- Samples and hold low-pass filters behind the delay lines suppress the clock signal. The undelayed and delayed signals now are added and fed to the output pins 11/12 via a buffer.

b. Quick reference data

Parameter		Synbol	Min.	Typ.	Max.	Unit
Supply voltage	digital	V1-3	5.0	—	6.0	V
	analog	V9-10	5.0	—	6.0	V
Supply current	digital	I1	—	1.0	2.0	mA
	analog	I9	—	4.5	8.0	mA
Colour difference input signal	PAL, NTSC (peak-to-peak value)	U16-10	—	0.525	—	
		U14-10	—	0.675	—	V
	SECAM *1) (peak-to-peak value)	U16-10	—	1.05	—	V
		U14-10	—	1.35	—	V
Colour difference output signals amplitude ratio	PAL, NTSC	V16/V11	4.5	5.5	6.5	dB
		V14/V12	4.5	5.5	6.5	dB
	SECAM *1)	V16/V11	-1.5	-0.5	0.5	dB
		V14/V12	-1.5	-0.5	0.5	dB

The signals have to be balanced line sequentially.
The blanking levels have to be equal to the uncoloured signal.

c. Block Diagram



d. Pin Description

Pin	Description	Pin	Description
1	digital supply voltage	9	analog supply voltage
2	not connected	10	ground analog
3	ground digital	11	-(R-Y) output
4	test pin input	12	-(B-Y) output
5	sandcastle input	13	reference current
6	not connected	14	-(B-Y) input
7	test pin output	15	not connected
8	test pin input	16	-(R-Y) input

3) Colour Transient Improvement Circuit (TDA4565)

a. General Description

The TDA4565 is a monolithic integrated circuit for colour. Transient inprovement (CTI) and luminance delay line in gyrator technique in colour television receivers.

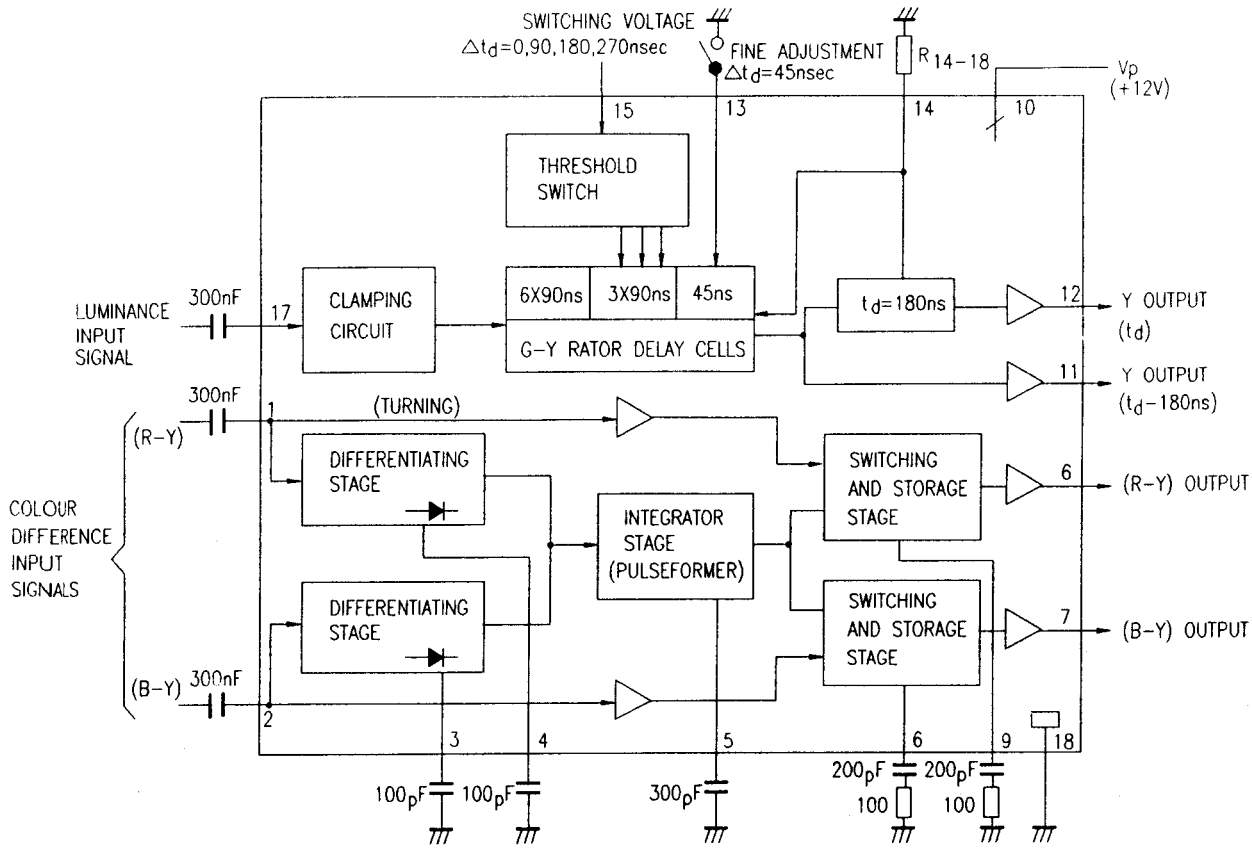
b. Features

- Colour transient inprovement for colour difference signals (R-Y, B-Y) with transient detecting, storage and switching stages resulting in high transient of colour difference output signals.
- A luminance signal path (Y) which substitutes the conventional Y-delay coil with an integrated Y-delay line.
- Switchable delay time from 690ns to 1005ns in step of 45ns.
- Two Y output signals : one of 180ns less delay.

c. Quick Reference data

Parameter	Symbol	Min.	Typ.	Max.	Unit
supply volatge	Vp	—	12	13.2	V
supply current	Ip	—	35	50	mA
(R-Y) and (B-Y) attenuation	α cd ttr	— —	0 150	— —	dB ns
(R-Y) and (B-Y) output transient time	td α y	690 —	— 6.5	1005 —	ns dB
adjustable Y-delay time					
Y-attenuation					

d. Block Diagram



4) Video Control Combination Circuit (TDA3505)

a. General Description

The TDA3505 is a monolithic integrated circuits which perform video control functions in a PAL/SECAM decoder. The TDA3505 is for negative colour difference signals (–(R-Y), –(B-Y)). The required input signals are : luminance and colour difference and 3-level sandcastle pulse for control purposes. Linear RGB signals can be inserted from an external source. RGB output signals are available for driving the video output stages. The circuits provide automatic cut-off control of the picture tube.

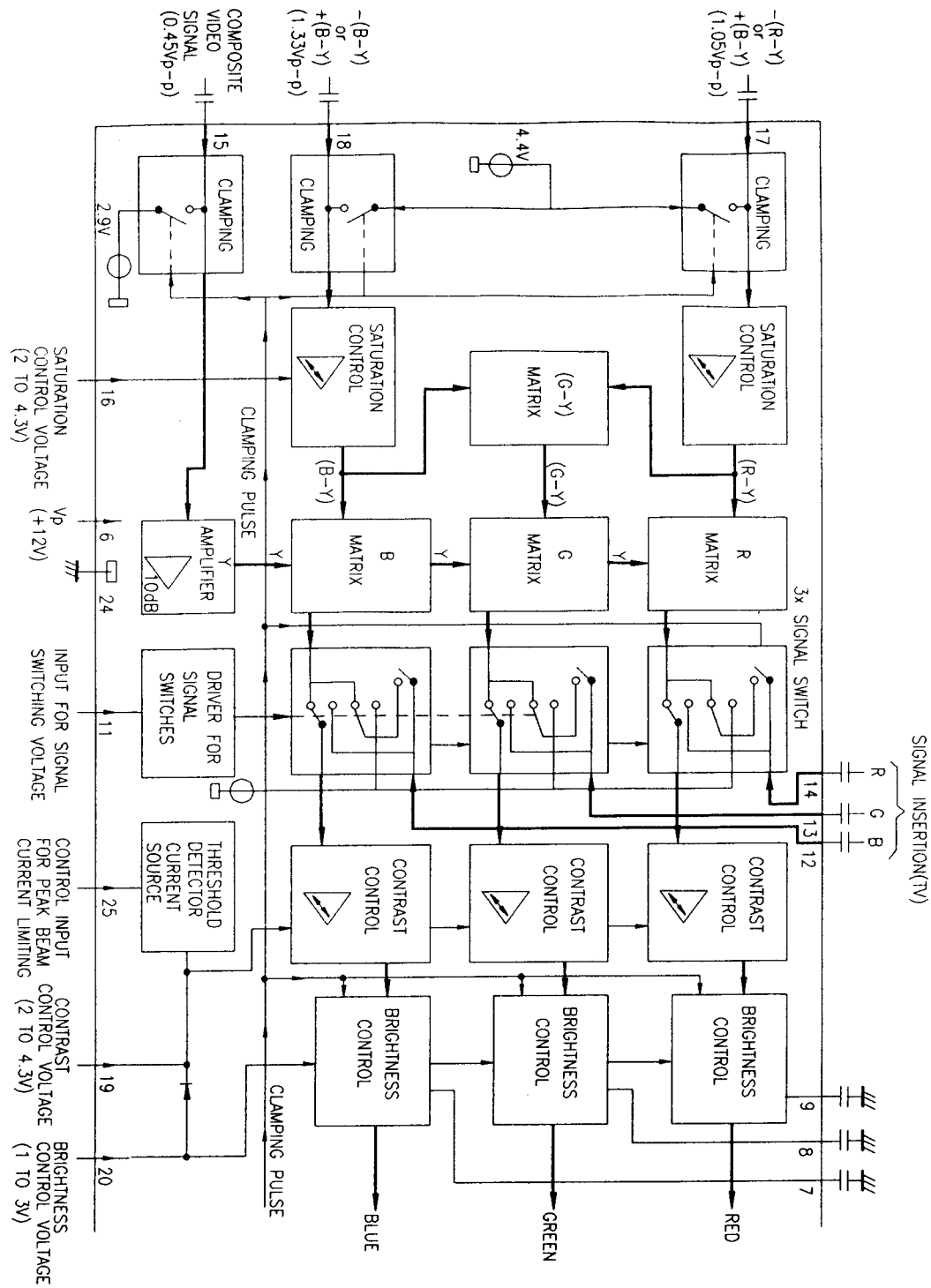
b. Features

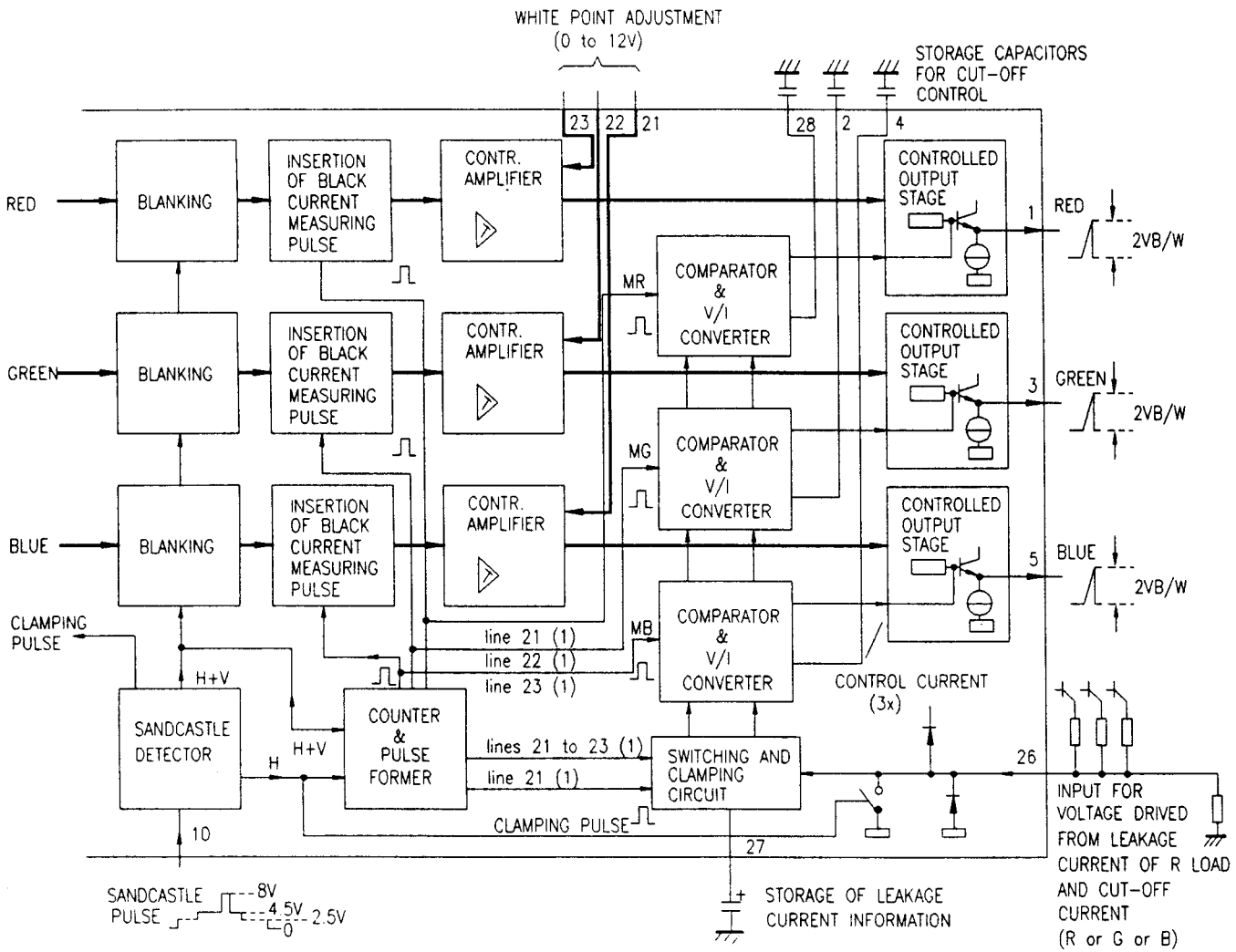
- Capacitive coupling of the colour difference and luminance input signals with black level clamping in the input stages.
- Linear saturation control on the colour difference signals.
- (G-Y) and RGB matrix.
- Linear transmission of inserted signals.
- Equal black levels for inserted and matrixed signals.
- 3 identical channels for the RGB signals.
- Linear contrast and brightness controls, operating on both the inserted and matrixed RGB signals.
- Peak beam current limiting input.
- Clamping, horizontal and vertical blanking of the three input signals controlled by a 3-level sandcastle pulse.
- 3 DC gain controls for the RGB output signals (white point adjustment).
- Emitter-follower outputs for driving the RGB output stages.
- Input for automatic cut-off control with compensation for leakage current of the picture tube.

c. Quick Reference data

Parameter		Symbol	Min.	Typ.	Max.	Unit
Supply voltage (pin 6)		Vp = V6-24	—	12	—	V
Supply current		Ip = I6	—	95	—	mA
Composite video input signals (peak-to-peak value)		V15-24(p.p)	—	0.45	—	V
Colour difference input signals (peak-to-peak value)	–(B-Y) or +(B-Y) respectively	V18-24(p.p)	—	1.33	—	V
	–(R-Y) or +(R-Y) respectively	V17-24(p.p)	—	1.05	—	V
Inserted RGB signals (black-to-white value)		V12, 13, 14-24	—	1.0	—	V
Three-level sandcastle pulse		V10-24	—	2.5	—	V
			—	4.5	—	V
			—	8.0	—	V
Control voltage range	brightness	V20-24	1.0	—	3.0	V
	contrast	V19-24	2.0	—	4.3	V
	saturation	V16-24	2.0	—	4.3	V

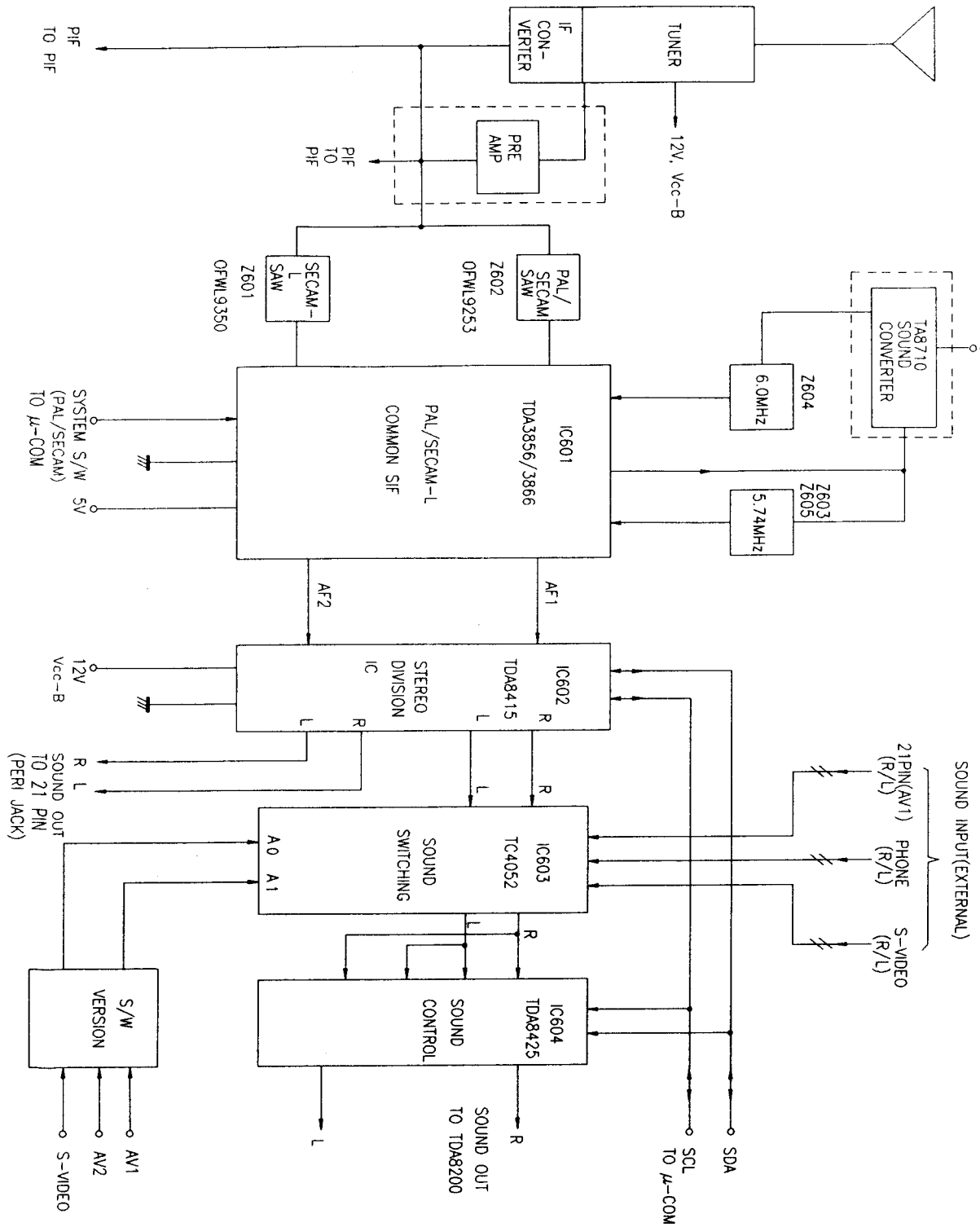
d. Block Diagram




WHITE POINT ADJUSTMENT
(0 to 12V)
STORAGE CAPACITORS
FOR CUT-OFF
CONTROL
23
22
21
28
2
4
RED
BLANKING
INSERTION
OF BLACK
CURRENT
MEASURING
PULSE
CONTR.
AMPLIFIER
CONTROLLED
OUTPUT
STAGE
1
RED
2VB/W
MR
COMPARATOR
&
V/I
CONVERTER
GREEN
BLANKING
INSERTION
OF BLACK
CURRENT
MEASURING
PULSE
CONTR.
AMPLIFIER
CONTROLLED
OUTPUT
STAGE
3
GREEN
2VB/W
MG
COMPARATOR
&
V/I
CONVERTER
BLUE
BLANKING
INSERTION
OF BLACK
CURRENT
MEASURING
PULSE
CONTR.
AMPLIFIER
CONTROLLED
OUTPUT
STAGE
5
BLUE
2VB/W
CLAMPING
PULSE
line 21 (1)
line 22 (1)
line 23 (1)
MB
COMPARATOR
&
V/I
CONVERTER
CONTROL CURRENT
(3x)
H+V
SANDCASTLE
DETECTOR
H
H+V
COUNTER
&
PULSE
FORMER
lines 21 to 23 (1)
line 21 (1)
SWITCHING AND
CLAMPING
CIRCUIT
26
INPUT FOR
VOLTAGE DRIVED
FROM LEAKAGE
CURRENT OF R LOAD
AND CUT-OFF
CURRENT
(R or G or B)
CLAMPING PULSE
10
27
SANDCASTLE
PULSE
8V
4.5V
0
2.5V
STORAGE OF LEAKAGE
CURRENT INFORMATION

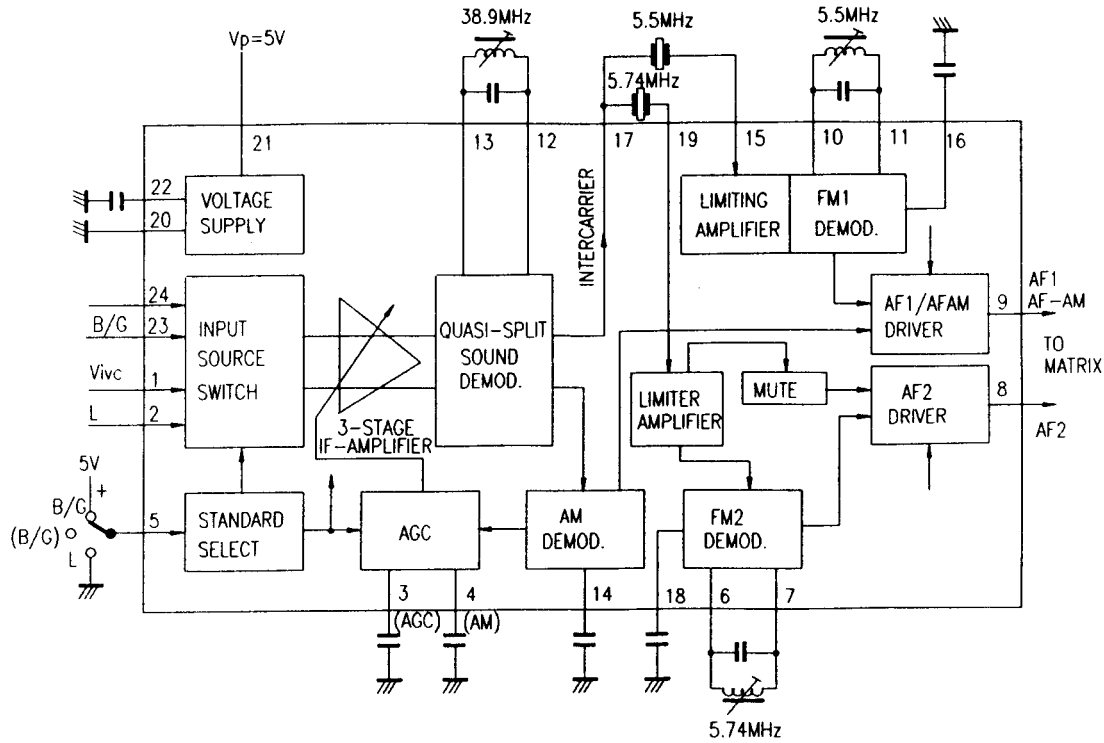
10. SOUND SECTION

1. SOUND BLOCK DIAGRAM



2. QUASI-SPLIT SOUND PROCESSOR (B/G AND L STANDARDS; TDA3856/3866)

Blcok Diagram



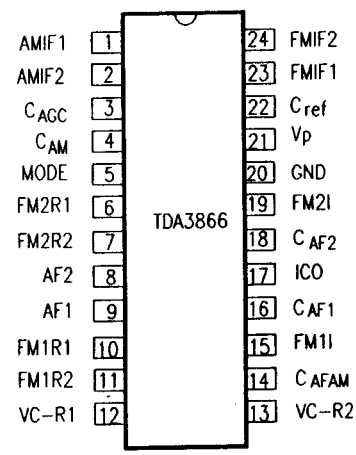
Features

1. Quasi-split sound processor for all standard e.g. B/G (FM sound) and L (AM sound).
2. Automatic switching of the AF2 signals (at B/G) by the input level.
3. AM signals processing for L standard and switching over the audio signal.

General Description

1. Separate symmetrical IF inputs for FM or AM sound.
2. Gain controlled wide-band IF, amplifier, input select switch.
3. AGC generation due to peak sync for FM or mean signal level for AM.
4. Reference amplifier for the regeneration of the vision carrier.
5. Optimized limiting amplifier for AM suppression in the regenerated vision carrier signal and 90° phase shifter.
6. Intercarrier mixer for FM sound output with low-pass.
7. Wide supply voltage range, only 300mW power dissipation at 5V.

Pin Configuration



1. Pinning

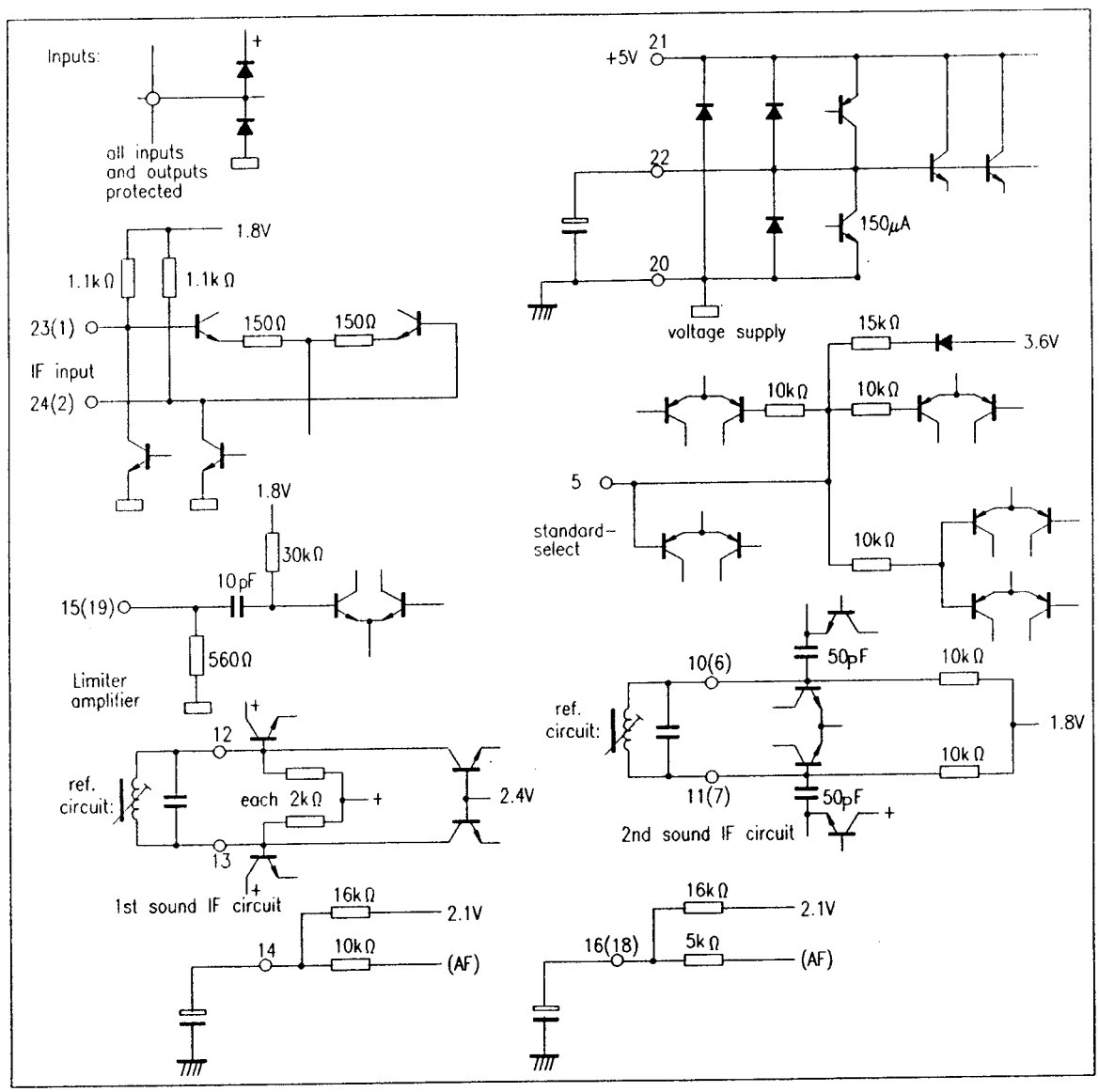
Pin	Symbol	Description
1	AMIF1	AM IF difference input 1 for L standard (32.4MHz).
2	AMIF2	AM IF difference input 2 for L standard.
3	CAGC	charge capacitor for AGC (FM and AM).
4	C-AM	charge capacitor for AM AGC.
5	MODE	tri-state input for standard select.
6	FM2R1	reference circuit for FM2 (5.74MHz).
7	FM2R2	reference circuit for FM2 (5.74MHz).
8	AF2	AF2 output (AF out of 5.74MHz).
9	AF1	AF1 output (AF out of 5.5MHz or AM).
10	FM1R1	reference circuit for FM1 (5.5MHz).
11	FM1R2	reference circuit for FM1 (5.5MHz).
12	VC-R1	reference circuit for the vision carrier (38.9MHz).
13	VC-R2	reference circuit for the vision carrier (38.9MHz).
14	CAFAM	DC-decoupling capacitor for AM demodulator (AF.AM).
15	FM1I	intercarrier input for FM1 (5.5MHz).
16	CAF	DC-decoupling capacitor for FM1 demodulator (AF1).
17	ICO	intercarrier output signal (5.5/5.74MHz).
18	CAF2	DC-decoupling capacitor for FM2 demodulator (AF2).
19	FM2I	intercarrier input for FM2 (5.74MHz).
20	GND	ground (0V).
21	Vp	+5... +8V supply voltage (pin 28 not connected).
22	Cref	charge capacitor for reference voltage.
23	FMIF1	IF difference input 1 for B/G standard (38.9MHz).
24	FMIF2	IF difference input 2 for B/G standard (38.9MHz).

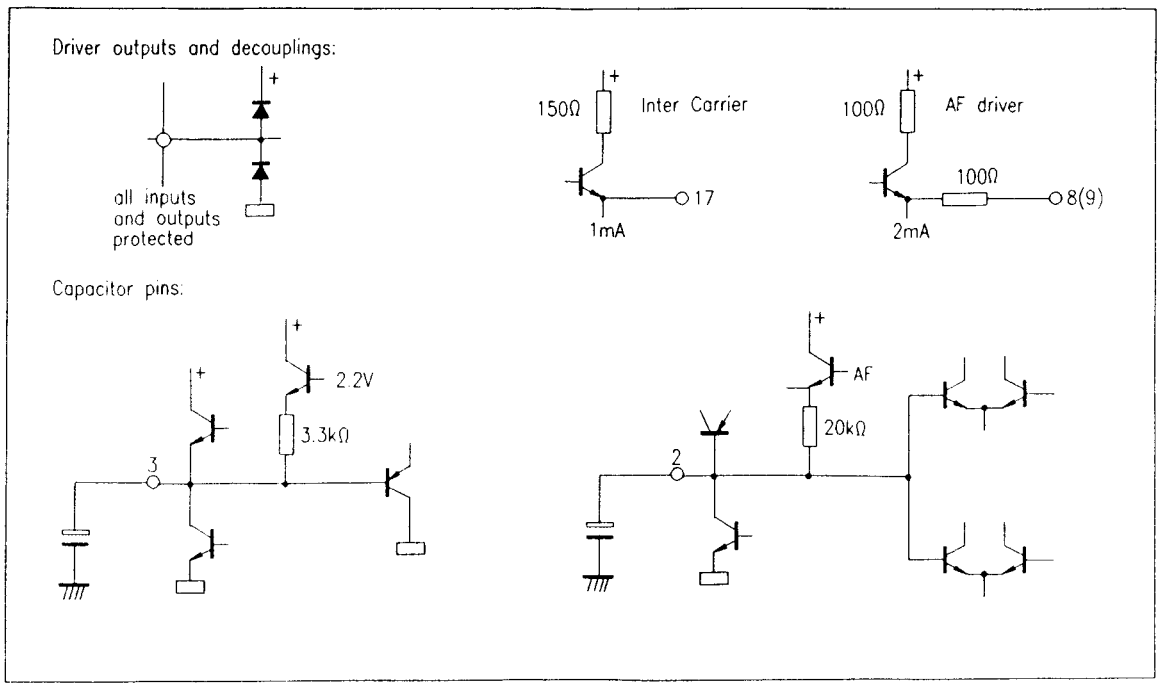
2. Characteristics

Pin	Parameter	Conditions	Min.	Typ.	Max.	Unit
1, 2,	input resistance		—	—	100	Ω
23, 24	input DC voltage low				0.1	V
	crosstalk attenuation of IF input switch		50	56	—	dB
3	IF gain control range		60	63		dB
	voltage for gain control range		1.7	—	2.6	V
5	input voltage in order to obtain standards					
	- B/G with automatic muting	pin 5 connected	2.8	—	Vp-1	V
		pin 5 open	—	2.8	—	V
	- B/G without muting (22KΩ to GND)	pin 5 connected alternative measure	1.3	—	2.3	V
	- SEACM-L (AM sound)	pin 5 connected	0	—	0.8	V
6, 7,	intercarrier signal voltage		—	100	—	mV
10, 11	DC voltage		—	1.8	—	V
8, 9	AF output signals voltage	FM	0.84	0.94	1.07	V
	output resistance		—	100	—	Ω
	DC voltage		—	2.1	—	V
	crosstalk attenuation		60	70	—	dB
9	AF output signals (mod 54%)	AM	530	600	675	mVrms
	output resistance		—	100	—	Ω
	signal to noise ratio		50	56	—	dB
12, 13	vision carrier amplitude	fo=38.9MHz	—	270	—	mV
	DC voltage		—	Vp-1	—	V
14	DC voltage		—	2	—	V

Pin	Parameter	Condition	Min.	Typ.	Max.	Unit
15, 19	minimum input signal	-3dB AF signal	—	300	450	μV
	maximum input signal		200	—	—	mV
	input resistance		—	560	—	Ω
	DC voltage			0		V
16,18	DC voltage		—	1.7	—	V
17	output signal for 5.5MHz		71	95	125	mVrms
	output signal for 5.74MHz		32	43	56	mVrms
	output resistance			30		Ω
	DC voltage			1.75		V
20	GND					
21	supply voltage range		4.5	5	8.8	V
	supply current		48	60	72	mA

Application Information





Functional Description

The quasi-split sound processor is for all standards. Dependent on the voltage on pin 5 either FM mode (B/G) or AM mode (L) is selected.

1. B/G standard (FM mode) :
   Pin 23 and 24 are active, AGC detector uses peak sync level. Sound carrier SC1 (5.5MHz) provides AF1, sound carrier SC2 (5.74MHz) provides AF2. With no sound carrier SC2 on pin 19, AF2 output is muted (in mid-position of the standard select switch FM mode without muting of AF2 is selected).
   The mute circuit prevents a false signal recognition in the stereo decoder at high IF signal levels when no second sound carrier exists (mono) and an AF signal is present in the identification signal frequency range.
   With 1mV on pin 19, under measurement conditions, AF2 is switched on (see limiting amplifier).
   Weak input signals at pins 23 and 24 generate noise on pin 19, which is present in the intercarrier signal and passes through the 5.74MHz filter. Noise on pin 19 inhibits muting, no misinterpretation due to white noise occurs in the stereo decoder ; when non-correlated noise masks the identification signal frequencies, which may be present in sustained tone signals. The stereo decoder remains switched to mono.
2. L standard (AM mode) :
   Pins 1 and 2 are active, AGC detector uses mean signal level. The audio signal from the AM demodulator is output on AF1, with AF2 output muted.
   The series capacitor Cs in 38.9MHz resonant circuit provides a notch at the sound carrier frequency in order to provide more attenuation for the sound carrier in the vision carrier reference channel.
   The ratio of parallel/series capacitor depends on the ratio of VC/SC frequency and has to be adapted to other TV transmission standards if necessary, according to the formula
   $Cs = Cp(fvc/fsc)^2 - Cp.$
   The result is an improved "intercarrier buzz" (up to 10dB improvement in sound channel 2 with 250KHz video modulation for B/G stereo) or suppression of 350KHz video modulated NICAM subcarrier.
   The picture carrier for quadrature demodulation in the intercarrier mixer is not exactly 90 degrees due to the shift variaton in the integrated phase shift network.
   The tuning of the LC reference circuit to provide optimal video suppression at the intercarrier output is not the same as to provide optimal intercarrier buzz suppression. In order to optimize the AF signal performance, a fine tuning for the optimal S/N at the sound, channel 2 (from 5.74MHz) may be performed with a 250KHz square wave video modulation.
3. Measurements at the demodulators:
   For all signal-to-noise measurements the generator must meet the following specifications ; phase modulation errors < 0.5 degree for B/W-jumps intercarrier signal-to-noise ratio as measured with "TV-demodulator AMAF2" (weight S/N) must be > 60dB at 6KHz sine wave modulation of the B/W-signal. Signal-to-noise ratios are measured with $\Delta f = \pm 50$KHz deviation and $f_{mod} = 1$KHz : with a deviation of ±30KHz the S/N ratio is deterioration of 4.5dB.

3. INTEGRATED FILTERS AND I²C-BUS CONTROL (TDA8415)

General Description

The TDA8415 is a processor of stereo/dual language signals (B/G-standard) for stereo sound television receivers and VTRs, using the switched-capacitor technique. The AF signals at the TDA8415 inputs must be "(L+R)/2" or "language A" on one channel and "R" or "language B" on the second channel (where L = left and R = right). The carrier frequency of the second channel is also modulated by an identification signal (stereo or dual sound). The device is controlled by a microcomputer via the two-line, bidirectional I²C-bus.

Features

- Use of the switched-capacitor technique for signal processing
- Small amout of peripheral components
- Integrated anti-aliasing filters
- Low distortion AF signal handling
- Integrated de-emphasis with a time constant of 50 μs
- Function and software are compatible with the TDA8405
- Two general purpose output ports
- Full ESD protection

Functional Description

a. Anti-aliasing filters

Frequency band limitation is performed by a second order sallon and key low-pass filter inserted in the AF signal path and the identification circuit. This limitation is necessary because of the time-discrete signal processing needed to meet the nyquist criterium.

b. Identification

To enable identification of the transmitted AF signal (mono, stereo or dual sound), the carrier frequency of the second channel (E2) is also modulated by an identification signal. The identification signal is a 54.6875 kHz pilot carrier signal which is 50% amplitude modulated by either a 117.4Hz signal for stereo transmission or by a 274.1Hz signal for dual sound transmission. The identification section of the circuit consists of a 54 kHz high-pass filter followed by a gain controlled amplifier with an AM demodulator. The total gain of the high-pass filter and the amplifier is approximately 56dB. The demodulated identification signal is filtered by the identification band-pass filters (117.4Hz for stereo transmission, 274.1Hz for dual sound transmission). The output from either filter is converted to a DC signal by a peak detector and the necessary hysteresis is performed by a Schmitt-trigger. The resultant DC output signals indicate the status of the transmitter (mono, stereo or dual sound).

c. De-matrix and de-emphasis

Depending on the results of the identification circuit (mono, stereo or dual sound) the AF signals at the inputs E1 and E2 are converted to the signals at E1* and E2* as listed in Table 1.

Table 1. Transmitter status

transmitter status	E1	E2	E1*	E2*
mono	0.7(L+R)	—	2(L+R)	—
stereo	0.7(L+R)	2R	4L	4R
dual sound	0.7A	B	2A	2B

Where L = left channel signal; R = right channel signal; A = first sound channel signal and B = second sound channel signal.
This section of the circuit also performs the de-emphasis (50μs time constant) with a high degree of accuracy.

d. AF switch

The AF switch is used to switch to either the terminal sound sources (E1* and E2*) or, to the external sound source (E3 and E4) and is controlled via the I²C- bus.

e. Source selector

The source selector is used to connect the outputs from the AF switch to the outputs A1 to A4 as illustrated. The selector is controlled via the I²C-bus.

f. Muting

In this mode the AF outputs A1 to A4 are muted, and the identification circuit is deactivated (mono). The muting is active after power-on reset or as a result of user control (via the mute input and bit CR3 of the control byte of the mute and port control register).

g. Sound mute

If the switch register is set to (00) hex, (sound mute) only the AF outputs are muted, the identification circuit is still active and can be read (status register) via the I²C-bus.

h. Power-on reset

The following actions are carried out by the internal power-on reset when it is active:

- The AF outputs are muted
- The identification circuit is deactivated (mono)
- The control ports (C1 and C2) are set LOW
- The I2C-bus transceiver is initialized

When the power-on reset becomes passive the following occurs:

- The AF outputs are kept in the mute state until the contents of the switch register are changed from (00) hex via the I²C-bus

- The identification circuit is activated
- The control ports are LOW until the mute and control port register is changed (CR bits 10,11,20 and 21)
- The I^2C-bus transceiver is activated

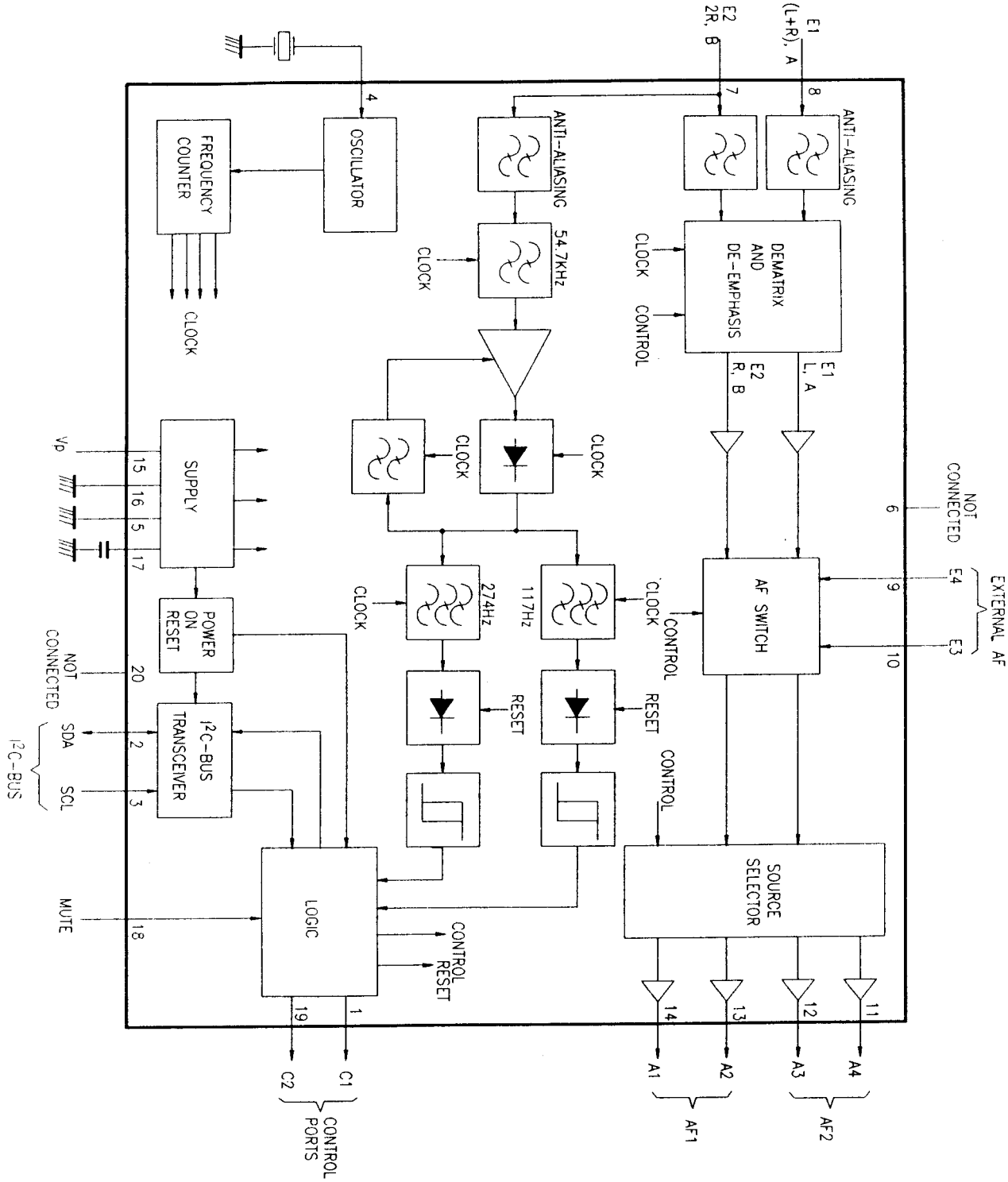
pinning

1. Control port C1
2. SDA, serial data line (I^2C-bus)
3. SCL, serial clock line (I^2C-bus)
4. Oscillator input (or quartz)
5. Digital ground (0V)
6. Not connected, but reserved
7. Sound channel input AF2 (E2)
8. Sound channel input AF1 (E1)
9. External AF input (E4)
10. External AF input (E3)
11. Output A4 AF2 output
12. Output A3 AF2 output
13. Output A2 AF1 output
14. Output A1 AF1 output
15. Supply voltage Vp
16. Analogue ground (0V)
17. Ripple rejection improvement
18. Mute input
19. Control port C2
20. Not connected, but reserved

Description and Ratings

Pin	Descrition		Min.	Typ.	Max.	Unit
1	Control port C1	Low	—	—	0.5	V
		High	4.5	—	5	V
2	SDA serial data line (I2C-bus)	Low	-0.3	—	1.5	V
		High	3	—	5	V
3	SCL serial clock line (I2C-bus)	Low	-0.3	—	1.5	V
		High	3	—	5	V
4	Oscillator input		1.7	—	—	V
5	Digital ground					
6	Not connected					
7	Sound/channel input AF2 (E2)	DC	—	3.25	—	V
		AC	—	—	1	V
8	Sound/channel input AF1 (E1)	DC	—	3.25	—	V
		AC	—	—	0.7	V
9	External AF input (E4)		—	3.25	—	V
10	External AF input (E3)					
11	Output A4	DC	—	3.25	—	V
12	Output A3					
13	Output A2	AC	—	—	2	V
14	Output A1					
15	Supply voltage		10.8	12	13.2	V
16	Analogue ground			0		V
17	Ripple rejection improvement		—	3.25	—	V
18	Mute input	Low	-0.3	—	1.5	V
		High	3	—	5	V
19	Control port C2	Low	—	—	0.5	V
		High	4.5	—	5	V
20	Not connected					

Block Diagram



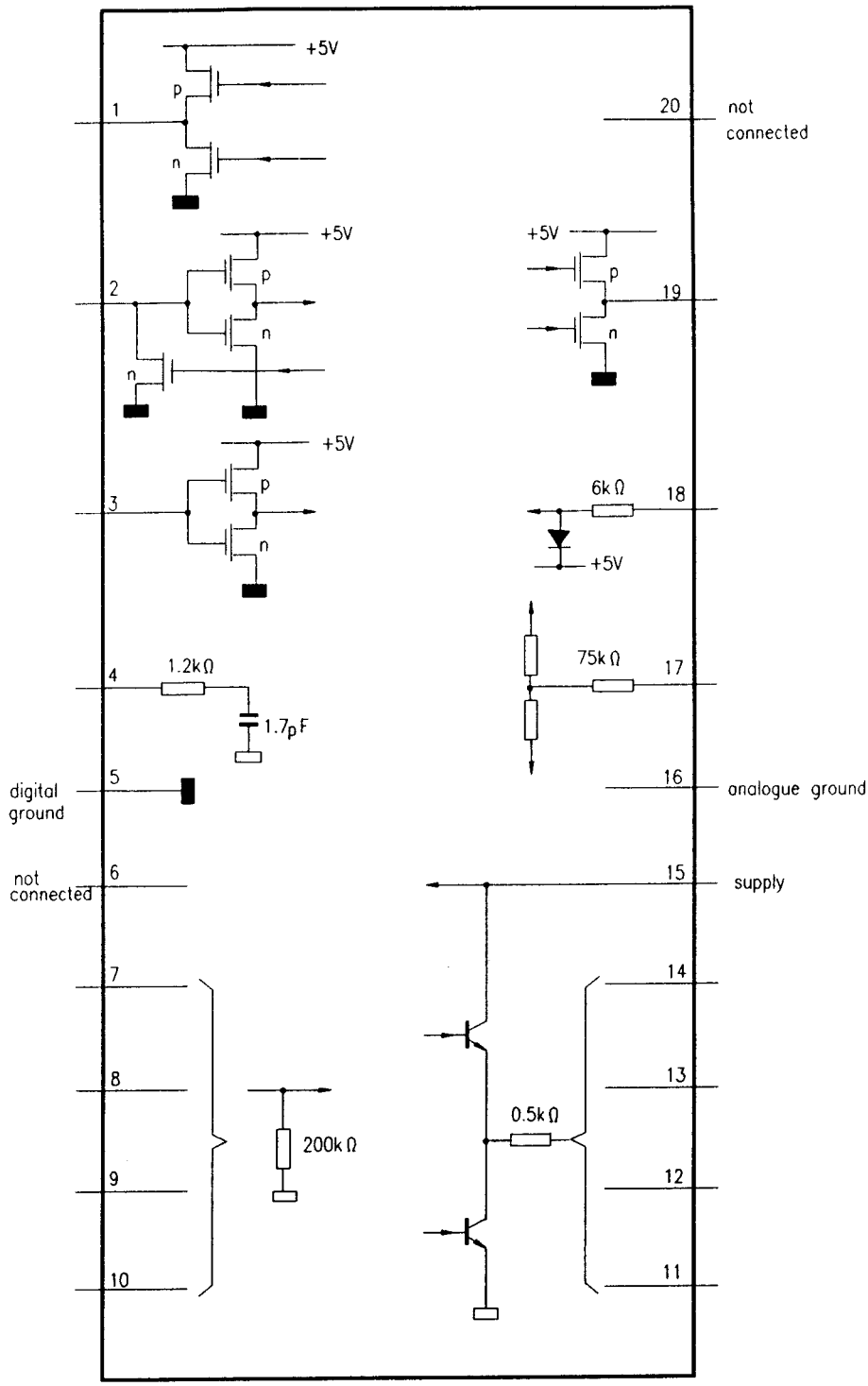


Figure. Input and output loading diagram

4. HI-FI STEREO AUDIO PROCESSOR ; I^2C-BUS (TDA8425)

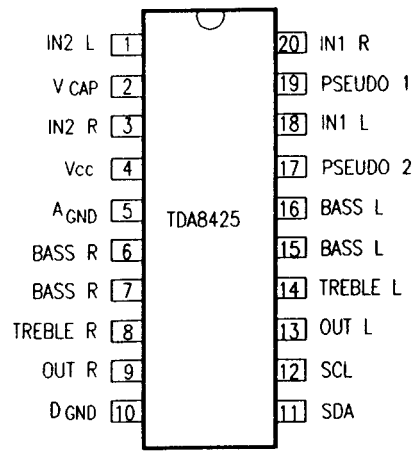
General Description

The TDA8425 is a monolithic bipolar integrated stereo sound circuit with a loadspeaker channel facility, digitally controlled via the I^2C-bus for application in hi-fi audio and television sound.

Features

- Source and mode selector for two stereo channels
- Pseudo stereo, spatial stereo, linear stereo and forced mono switch
- Volume and balance control
- Bass, treble and mute control
- Power supply with power-on reset

Pinning



Pin	Parameter	Symbol	Min.	Typ.	Max.	Unit
1	Input 2 (Left)	VI	—	Vref	—	V
2	Voltage range for pins with external capacitors	Vcap	—	Vcc-0.3	—	V
3	Input 2 (Right)	VI	—	Vref	—	V
4	Supply voltage	Vcc	10.8	12	13.2	V
5	Analog ground	AGND		0		V
6	Bass right	Vcap	—	Vref	—	V
7	Bass right					
8	Treble right	Vcap	—	Vref	—	V
9	Output right	Vo	—	Vref	—	V
10	Digital ground	DGND	—	0		V
11	Serial data	Low	-0.3	—	1.5	V
		High	3.0	—	Vcc	V
12	Serial clock	Low	-10	—	—	μA
		High	—	—	10	μA
13	Output left	Vo	—	Vref	—	V
14	Treble left	Vcap	—	Vref	—	V
15	Bass left					
16	Bass left					
17	Pseudo 2					
18	Input 1 (Left)					
19	Pseudo 1					
20	Input 1 (Right)					

Functional Description

Source Selector ; The input to channel 1 (CH 1) and channel 2 (CH 2) is determined by the source selector. The selection is made from the following AF input signals

- IN1L (pin 18); IN1R (pin 20) or
- IN2L (pin 1) ; IN2R (pin 3).

a. Mode selector

The mode selector selects between stereo, sound A and sound B (in the event of bilingual transmission) for OUT R and OUT L.

b. Volume control and balance

The volume control consists of two stages (left and right). In each part the gain can be adjusted between +6dB and -64dB insteps of 2dB.

An additional step allows an attenuation of ≥ 80dB. Both parts can be controlled indepently over the whole range, which allows the balance to be varied by controlling the volume of left and right output channels.

c. Linear stereo, pseudo stereo, spatial stereo and forced mono mode*

It is possible to select four modes :
Linear stereo, pseudo stereo, spatial stereo or forced mono.
The pseudo stereo mode handles mono transmissions, the spatia; stereo mode handles stereo transmissions and the forced mono can be used in the event of stereo signals.

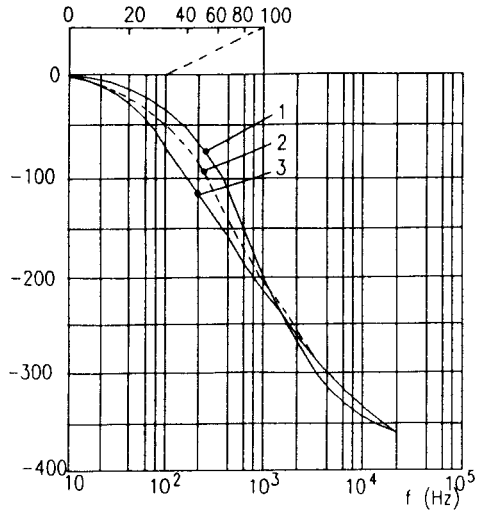


Figure. Pseudo (phase in degrees) as a function of frequency (left output).

curve	pin 17 (nF)	pin 19 (nF)	effect
1	15	15	normal
2	5.6	47	intensified
3	5.6	68	more intensified

d. Bias and power supply

The TDA 8425 includes a bias and power supply stage, which generates a voltage of 0.5 x Vcc with a low output impedance and injector currents for the logic part.

e. Power-on reset

The on-chip power-on reset circuit sets the mute bit to active, which mutes both parts of the treble amplifier. The muting can be switched by transmission of the mute bit.

f. Treble control

The treble control stage can be switched from +12 dB to -12 dB in steps of 3 dB.

g. I^2C-bus receiver and data handling

Bus specification :

The TDA8425 is controlled via the 2-wire I^2C-bus by a microcomputer. The two wires (SDA–serial data, SCL–serial clock) carry information between the devices connected to the bus. Both SDA and SCL are bidirectional lines, connected to a positive supply voltage via a pull-up resistor.
When the bus is free both lines are HIGH.
The data on the SDA line must be stable during the HIGH period of the clock. The HIGH or LOW stage of the data line can only change when the clock signal on the SCL line is LOW. The set up and hold times are specified in AC characteristics.
A HIGH-to-LOW transition of the SDA line while SCL is high, is defined as a start condition. A LOW-to-HIGH transition of the SDA line, while SCL is high, is defined as a stop condition. The bus receiver will be reset by the reception of a start condition. The bus is considered to be busy after the start condition.
The bus is considered to be free again after a stop condition.

h. Bass control

The bass control stage can be switched from an emphasis of 15 dB to an attenuation of 12 dB for low frequencies in steps of 3 dB.

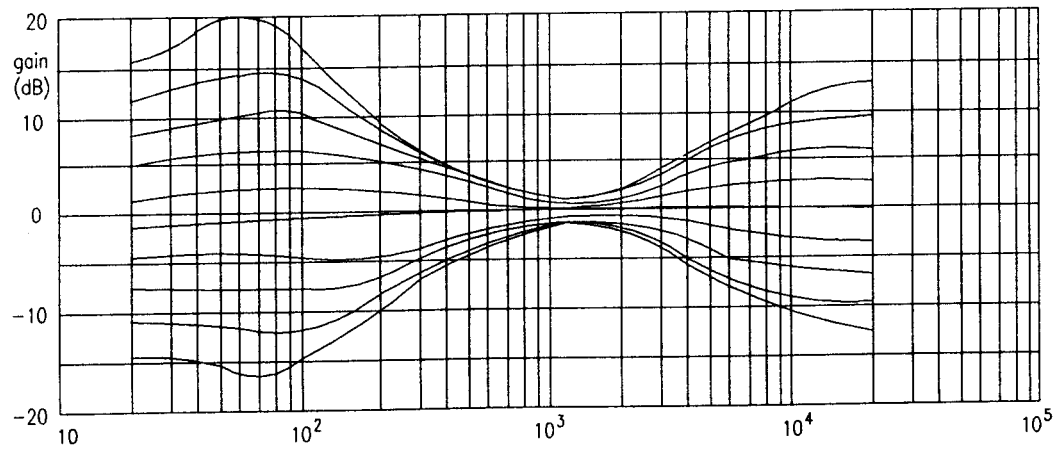
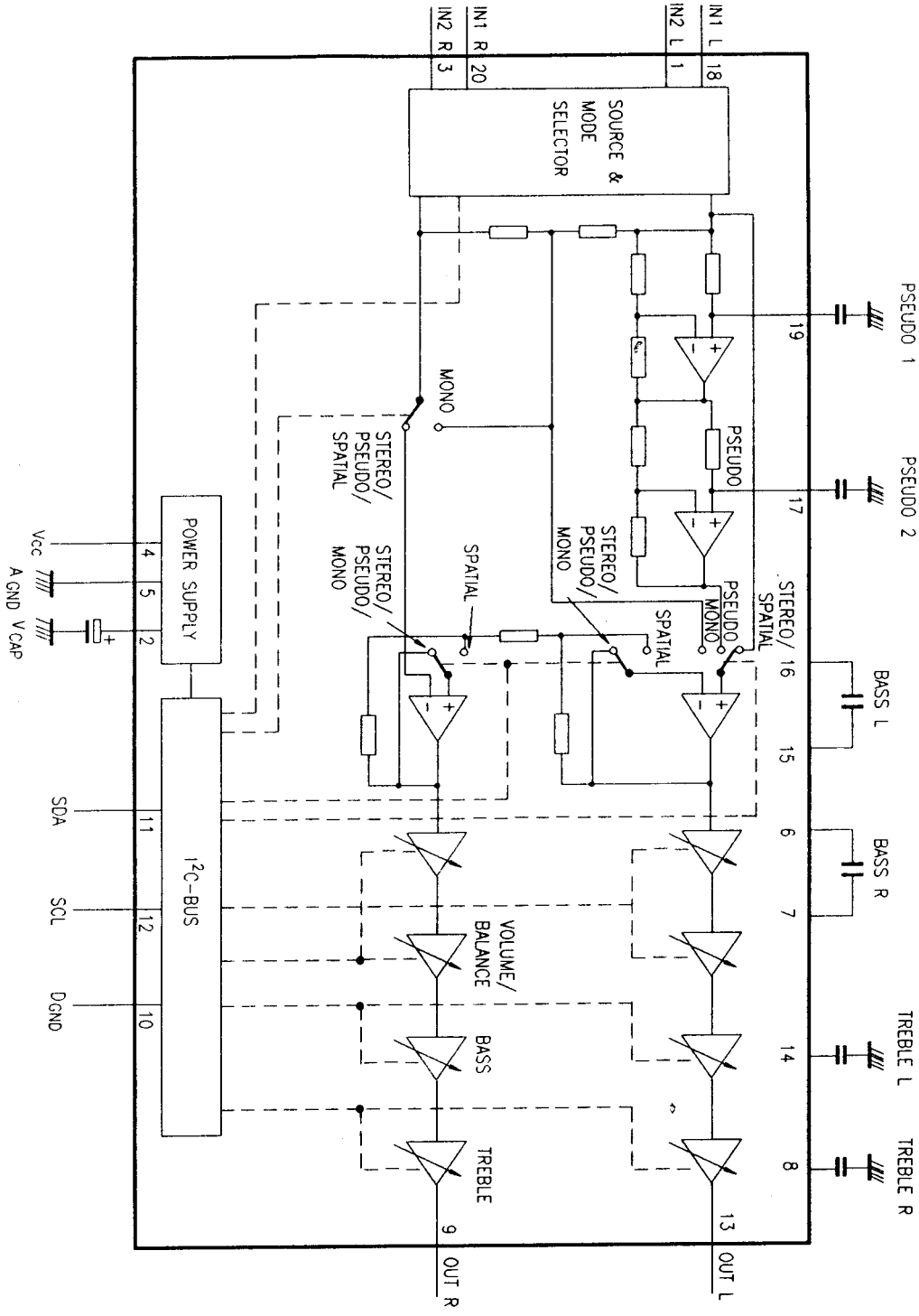


Figure. Frequency response of bass and treble control: bass and treble gain settings = -12 to +15dB; gain is 0dB; Vi=0.1V; RS9=600Ω; RL=10kΩ; Vcc=12V.

Block Diagram



5. TA8200AH SPECIFICATION

Dual Audio Power Amplifier (TA8200AH)

The TA8200AH is a dual audio power amplifier for consumer applications. This IC provides an output power of 13 Watts per channel (at Vcc = 28V, f = 1 KHz, THD = 10%, R_L = 8Ω). It is suitable for the power amplifier of TV and home stereo.

- High Output Power : P_{OUT} = 13W (Typ.) (Vcc = 28V, R_L = 8Ω, f = 1KHz, THD = 10%).
- Very Few External Parts.
- Built in thermal shut down protector circuit.
- Operating supply voltage range :Vcc(opr) = 10–37V.
- Built in audio muting circuit.

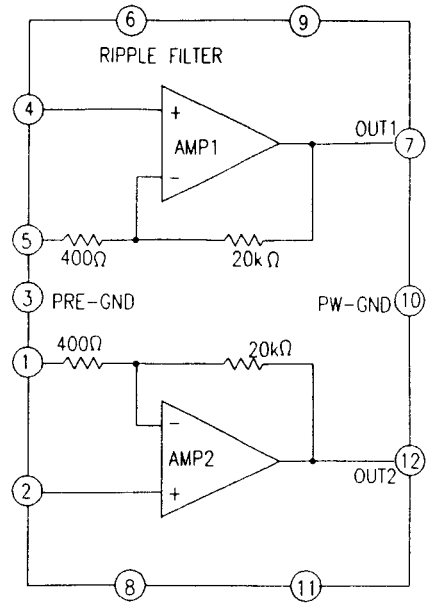


Figure. 1

Maximum Ratings (Ta = 25°C)

* Weight : 4.04g(Typ.)

Characteristic	Symbol	Rating	Unit
Supply voltage	Vcc	37	V
Output current (peak/ch)	Io(peak)	2.5	A
Power dissipation	PD	25	W
Operating temperature	Topr	−20 ~ 75	°C
Storage temperature	Tstg	−55 ~ 150	°C

Electrical Characteristics

(Unless otherwise specified, Vcc = 28V, R_L = 8Ω, Rg = 600Ω, f = 1KHz, Ta = 25°C)

Characteristic	Symbol	Test circuit	Test condition	Min.	Typ.	Max.	Unit
Quiescent current	I_{CCQ}	—	V_{IN} = 0	—	50	105	mA
Output Power	P_{OUT}(1)	—	THD = 10%	10	13	—	W
	P_{OUT}(2)	—	THD = 1%	—	10	—	
Total harmonic distortion	THD	—	P_{OUT} = 2W	—	0.04	0.2	%
Voltage gain	Gv	—	Closed Loop	32.5	34.0	35.5	dB
Input resistance	R_{IN}	—	—	—	30	—	KΩ
Ripple rejection ratio	R.R.	—	Rg = 0, fripple = 100Hz, Vripple = 0dBm	40	50	—	dB
Output noise voltage	V_{NO}	—	Rg = 10KΩ BW = 20Hz ~ 20KHz	—	0.14	0.3	mVrms

Application Information

a. Voltage gain

The closed loop voltage gain is determined by R1, R2.

$$G_V = 20log\ \frac{R1+R2}{R2}\ (dB)$$

$$= 20log\ \frac{20x1000+400}{400}$$

$$= 34dB.$$

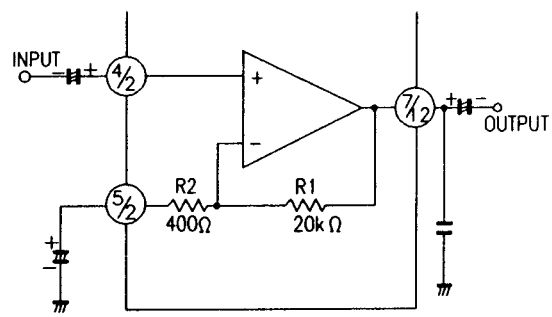


Figure. 2

b. Amplifier with gain < 34dB.

$$GV = 20log \frac{R1+R2+R3}{R2+R3} \quad (dB)$$

when R3 = 220Ω

GV = 30dB is given.

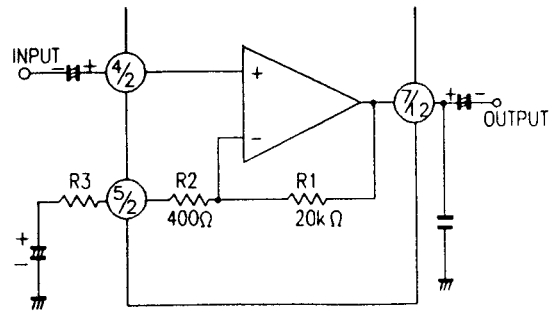


Figure. 3

Muting

a. Audio Muting

This IC is possible to make audio muting operation by using pin 11 muting terminal. In Fig. 4, the equivalent circuit in the muting circuit section is shown. By means of reducing the voltage of pin 11 down to 2.8V or less in Fig. 4, Q1 is turned ON and the base voltage of Q2 in the differential circuit fabricated with Q2 and Q3.

Therefore, with the voltage reduction of pin 11, the input circuits of dummy of input terminal and that in the doted line operate and cut-off the input signal. After muting, the bias circuit continues its operation and the power supply current of quiescent time.

Pin 8, the capacitor terminal for reducing the pop noise through making the time constant longer by means of inserting the capacitor externary.

In the care this terminal is not used, short pin 8 with pin 11. The voltage of pin 11 set up to 4V or more.

b. IC internal muting at Vcc OFF

When Vcc = 8V or less at Vcc off, the detection circuit at Vcc off is operated. And the base voltage of Q1 is reduced and the muting operation is mode.

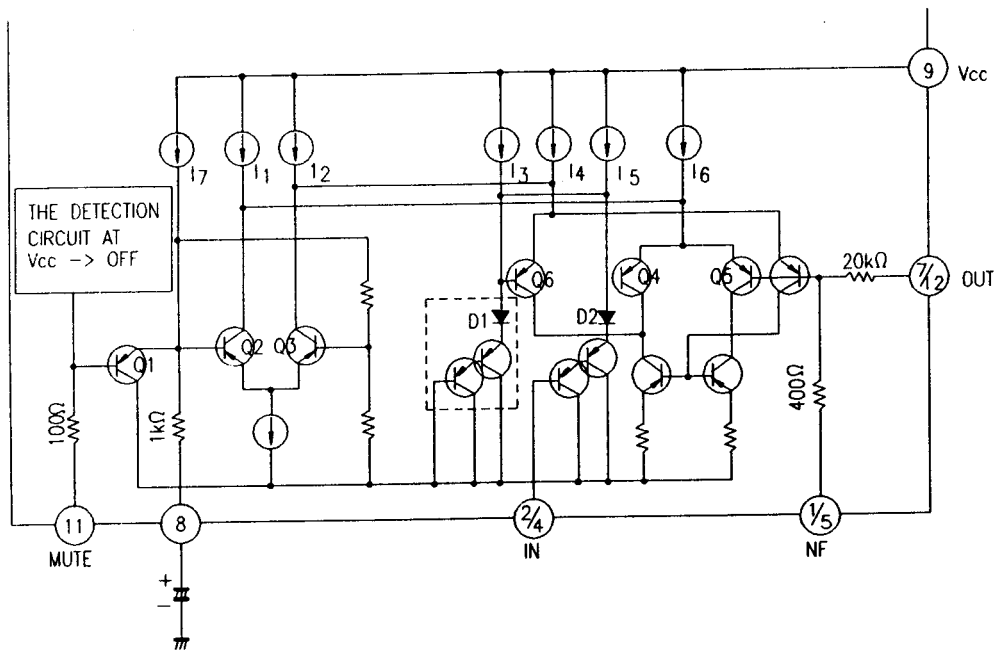
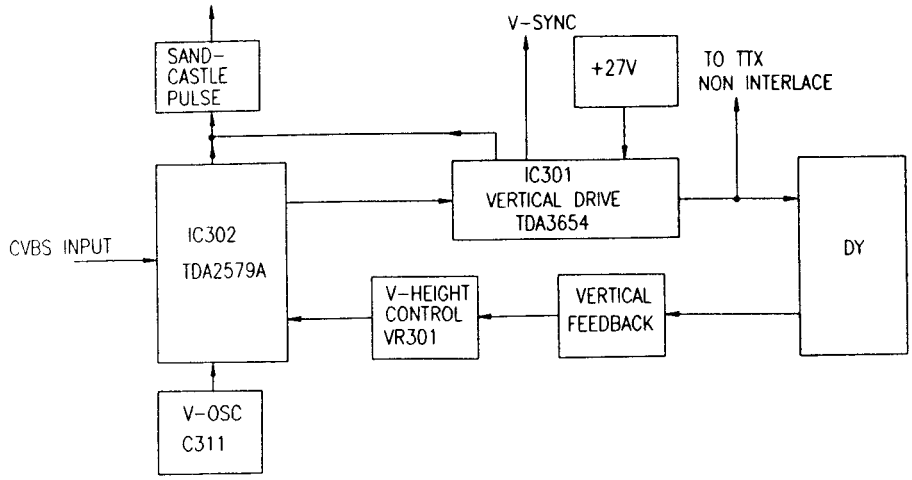


Figure. 4

11. DEFLECTION SECTION

1. VERTICAL SECTION BLOCK DIAGRAM



General Description

The TDA3654 is a full performance vertical deflection output circuit in a 9-lead in line encapsulation. The circuit is intended for direct drive of the deflection coils and it can be used for a wide range of 90° and 110° deflection systems.
The TDA3654 is provided with a guard circuit which blanks the picture tube screen in case of absence of the deflection current.

a. Feature

- Direct drive to the deflection coils
- 90° and 110° deflection system
- Internal blanking guard circuit
- Internal voltage stabilizer

b. Quick reference data

Output voltage:	V_{5-2}	max.	60V
Output current (peak-to-peak):	$I_{5(p-p)}$	max.	3A
Supply voltage:	V_{9-2}	max.	40V
Guard circuit output voltage:	V_{7-2}	max.	5.6V
Operating ambient temperature range:	Tamb		−25 to +60°C
Storage temperature:	Tstg		−65 to +150°C

c. Thermal resistance

From junction to mounting base:	Rthi-mb	3.5 to 4K/W

Bicok Diagram

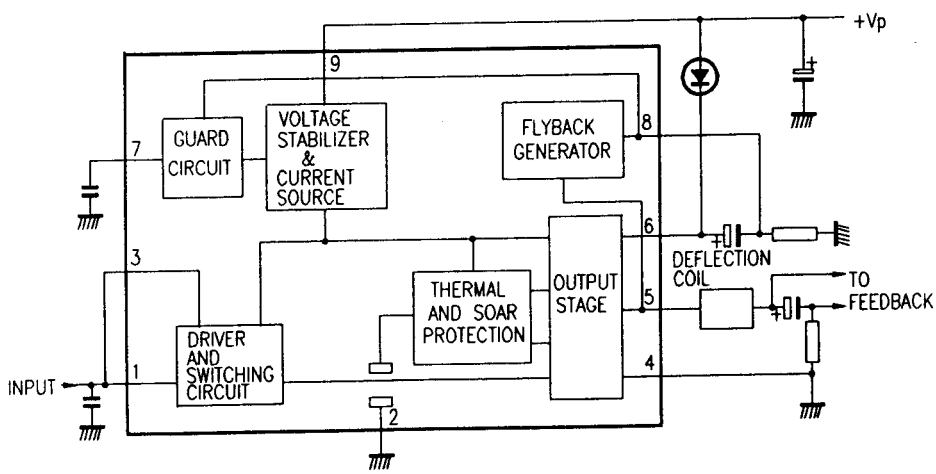


Figure 1.

Functional Description

a. Output stage and protection circuits

The output stage consists of two Darlington configurations in class B arrangement. Each output transistor can deliver 1.5A maximum and the VCEO is 60V. Protection of the output stage is such that the operation of the transistors remains well within the SOAR area in all circumstances at the output pin (pin 5). This is obtained by the cooperation of the thermal protection circuit, the current-voltage detector and the short circuit protection.
Special measures in the internal circuit layout give the output transistors extra solidity, this is illustrated where typical SOAR curves of the lower output transistor are given. The same curves also apply for the upper output device. The supply for the output stage is fed to pin 6 and the output stage ground is connected to pin 4.

b. Driver and switching circuit

Pin1 is the input for the driver of the output stage.
The signal at pin 1 is also applied to pin 3 which is the input of a switching circuit (pin 1 and 3 are externally connected).
This switching circuit rapidly turns off the lower output stage when the flyback starts and it, therefore, allows a quick start of the flyback generator. The maximum required input signal for the maximum output current peak-to-peak value of 3A is only 3V, the sum of the currents in pins 1 and 3 is then maximum 1mA.

c. Flyback generator

During scan, the capacitor between pin 6 and 8 is changed to a level which is dependent on the value of the resistor at pin 8 (see Fig. 1). When the flyback starts and the voltage at the output pin (pin 5) exceeds the supply voltage, the flyback generator is actived. The supply voltage is then connected in series, via pin 8, with the voltage across the capacitor during the flyback period. This implies that during scan the supply voltage can be reduced to the required scan voltage plus saturation voltage of the output transistors. The amplitude of the flyback voltage can be chosen by changing the value of the external resistor at pin 8.
It should be noted that the application is chosen such that the lowest voltage at pin 8 is > 1.5V during normal operation.

d. Guard circuit

When there is no deflection current, for any reason, the voltage at pin 8 becomes less than 1V, the guard circuit will produce a DC voltage at pin 7. This voltage can be used to blank the picture tube, so that the screen will not burn in.

e. Voltage stabilizer

The internal voltage stabilizer provides a stabilized supply of 6V to drive the output stage, so the drive current is not affected by supply voltage variations.

Ratings

Limiting values in accordance with the absolute maximum system (IEC134). Pins 2 and 4 are externally connected to ground.

a. Voltages

Output voltage:	V_{5-4}	0 to 60V
Supply voltage:	V_{9-4}	0 to 40V
Supply voltage output stage:	V_{6-4}	0 to 60V
Input voltage:	V_{1-2}	0 to V_{9-4}V
Input voltage switching circuit:	V_{3-2}	0 to V_{9-4}V
External voltage at pin 7:	V_{7-2}	0 to 5.6V

b. Currents

Repetitive peak output current:	$\pm I_{5RM}$	max.	1.5A
Non-repetitive peak output current (note 1):	$\pm I_{5SM}$	max.	3A
Repetitive peak output current of flyback generator:	I_{8RM}	max.	+1.5A −1.6A
Non-repetitive peak output current of flyback generator (note 1):	$\pm I_{8SM}$	max.	3A

c. Temperatures

Storage temperature range:	Tstg	−65 to +150°C
Operating ambient temperature range (see Fig. 2):	Tamb	−25 to +60°C
Operating junction temperature range:	Tj	−25 to +150°C

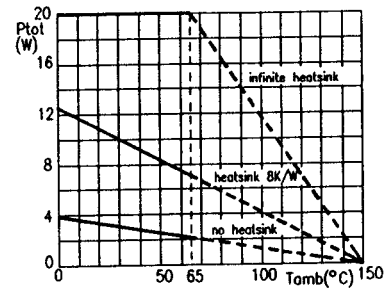


Figure 2. Power derating curve

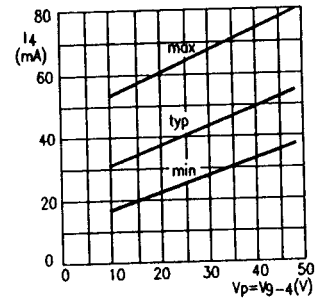


Figure 3. Quiescent as a function of the supply voltage

Characteristics

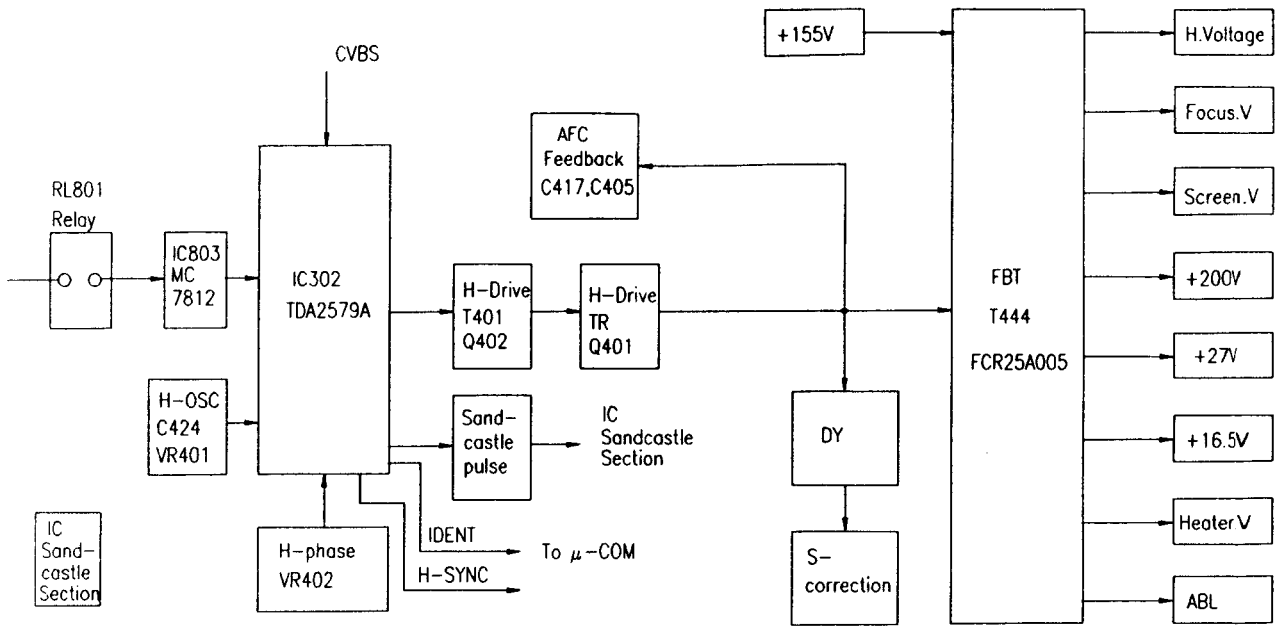
Tamb = 25°C supply voltage (V_{9-4}) = 26V; unless otherwise stated; pin 1 externally conneted to pin 3. Pin 2 and 4 externally connected to ground.

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply					
Supply voltage, pin 9 (note 2)	V_{9-4}	10	—	40	V
Supply voltage output stage	V_{6-4}	—	—	60	V
Supply current, pins 6 and 9 (note 3)	$I_6 + I_9$	35	55	85	mA
Quiescent current (note 4)	I_4	25	40	65	mA
Variation of quiescent current with temperature	TC	—	−0.04	—	mA/K
Output current					
Output current, pin 5 (peak-to-peak)	$I_{5(p-p)}$	—	2.5	3	A
Output current flyback generator, pin 8	$+I_{8(p-p)}$	—	1.25	1.5	A
	$-I_{8(p-p)}$	—	1.35	1.6	A
Output voltage					
Peak voltage during flyback	V_{5-4}	—	—	60	V
Saturation voltage to supply					
at $I_5 = -1.5A$	$V_{6-5(sat)}$		2.5	3.2	V
at $I_5 = 1.5A$ (note 5)	$V_{5-6(sat)}$		2.5	3.2	V
at $I_5 = -1.2A$	$V_{6-5(sat)}$		2.2	2.7	V
at $I_5 = 1.2A$ (note 5)	$V_{5-6(sat)}$		2.3	2.8	V
Saturation voltage ground					
at $I_5 = 1.2A$	$V_{5-4(sat)}$	—	2.2	2.7	V
at $I_5 = 1.5A$	$V_{5-4(sat)}$	—	2.5	3.2	V
Flyback generator					
Saturation voltage					
at $I_8 = -1.6A$	$V_{9-8(sat)}$	—	1.6	2.1	V
at $I_8 = 1.5A$ (note 5)	$V_{8-9(sat)}$	—	2.3	3	V
at $I_8 = -1.3A$	$V_{9-8(sat)}$	—	1.4	1.9	V
at $I_{58} = 1.2A$ (note 5)	$V_{8-9(sat)}$	—	2.2	2.7	V
Leakage current at pin 8	$-I_8$	—	5	100	μA
Flyback generator active if	V_{5-9}	4	—	—	V
Input					
Input current, pin 1, for $I_5 = 1.5A$	I_1	—	0.33	0.55	mA
Input voltage during scan, pin 1	V_{1-2}	—	2.35	3	V
Input current, pin 3, during scan (note 6)	I_3	0.03	—	—	mA
Input voltage, pin 3, during scan (note 6)	V_{3-2}	0.8	—	V_{9-4}	V
Input voltage, pin 1, during flyback	V_{1-2}	—	—	250	mV
Input voltage, pin 3, during flyback	V_{3-2}	—	—	250	mV
Guard circuit					
Output voltage, pin 7 at $R_L = 100k\Omega$ (note 9)	V_{7-2}	4.1	4.5	5.5	V
Output voltage, pin 7 at $I_L = 0.5mA$ (note 9)	V_{7-2}	3.4	3.9	5.1	V
Internal series resistance of pin 7	R_{i7}	0.95	1.35	1.7	kΩ
Guard circuit activates (note 7)	V_{8-2}	—	—	1.0	V
General data					
Thermal protection activation range	T_j	158	175	192	°C
Thermal resistance					
From junction to mounting base	$R_{th\ j-mb}$	—	3.5	4	K/W
Power dissipation	P_{tot}	—	see Fig. 2		
Open loop gain at 1kHz; (note 8)	G_o	—	33	—	
Frequency response, −3dB; (note 10)	f	—	60	—	kHz

* Note to the characteristics

1. Non-repetitive duty factor 3.3%.
2. The maximum supply voltage should be chosen so that during flyback the voltage at pin 5 does not exceed 60V.
3. When V_{5-4} is 13V and no load at pin 5.
4. See Fig. 3.
5. Duty cycle, d = 5% or d = 0.05.
6. When pin 3 is driven separately from pin 1.
7. During normal operation the voltage V_{8-2} may not be lower than 1.5V.
8. $R_L = 8\Omega$; $I_L = 125mA$ (r.m.s.).
9. If guard circuit is active.
10. With a 22 pF capacitor between pins 1 and 5.

2. HORIZONTAL SECTION BLOCK DIAGRAM



3. HORIZONTAL/VERTICAL SYNCHRONIZATION CIRCUIT

General Description

The TDA2579A generates and synchronizes horizontal and vertical signals. The device has a 3 level sandcastle output ; a transmitter identification signal and also 50/60Hz identification.

Features

- Horizontal phase detector (sync to oscillator), sync separator and noise inverter
- Triple current source in the phase detector with automatic selection
- Second phase detector for storage compensation of the horizontal output
- Stabilized direct starting of the horizontal oscillator and the output stage form main supply
- Horizontal output pulse with constant duty cycle value of 29μs
- Internal vertical sync separator, and two integration selection times
- Divider system with three different reset enable windows
- Synchronization is set to 628 divider ratio when no vertical sync pulses and no video transmitter is identified
- Vertical comparator with a low DC feedback signal
- 50/60Hz identification output combined with mute function
- Automatic amplitude adjustment for 50 and 60Hz and blanking pulse duration
- Automatic adaption of the burst-key pulse width

Quick reference data

Parameter	System	Min.	Typ.	Max.	Unit
Supply					
Minimum required current for starting horizontal oscillator and output stage	I_{16}	6.2	—	—	mA
Main supply voltage	V_{10}	—	12	—	V
Supply current	I_{10}	—	70	—	mA
Input signals					
Sync pulse input amplitude	$V_{5(p-p)}$	0.05	—	1.0	V
Horizontal flyback pulse input current	I_{12}	—	1	—	mA
Vertical comparator input signal					
Voltage AC	V_2	—	0.8	—	V
Voltage DC	V_2	—	1	—	V
Output signals					
Horizontal output (open collector) $I_{11}=25mA$	V_{11}	—	—	0.5	V
Vertical output stage driver (emitter follower) $I_1=1.5mA$	V_1	5	—	—	V
Sandcastle output levels					
V_{17} burst-key	V_{17}	9.8	—	—	V
horizontal blanking	V_{17}	—	4.5	—	V
vertical blanking	V_{17}	—	2.5	—	V
Video transmitter identification output stage (open collector loaded with external resistor to positive supply), No sync pulse present	V_{13}	—	—	0.5	V
	I_{13}	—	—	5	mA
Sync pulse present					
divider ratio > 576	V_{13}	—	V_{10}	—	V
divider ratio < 576	V_{13}	—	7.65	—	V

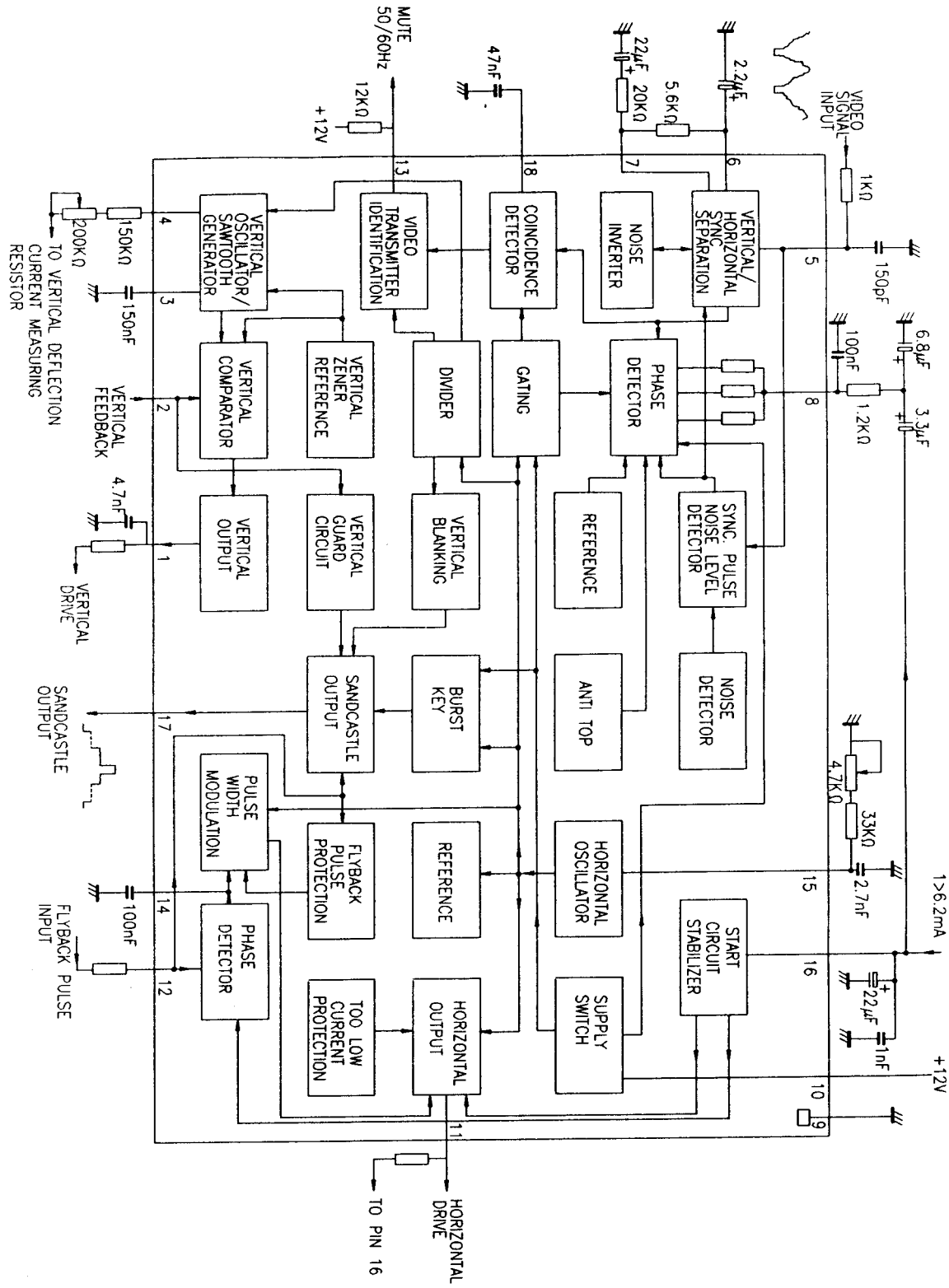
Package Outline

18 lead dual in line ; plastic (SOT 102H).

Pin Description

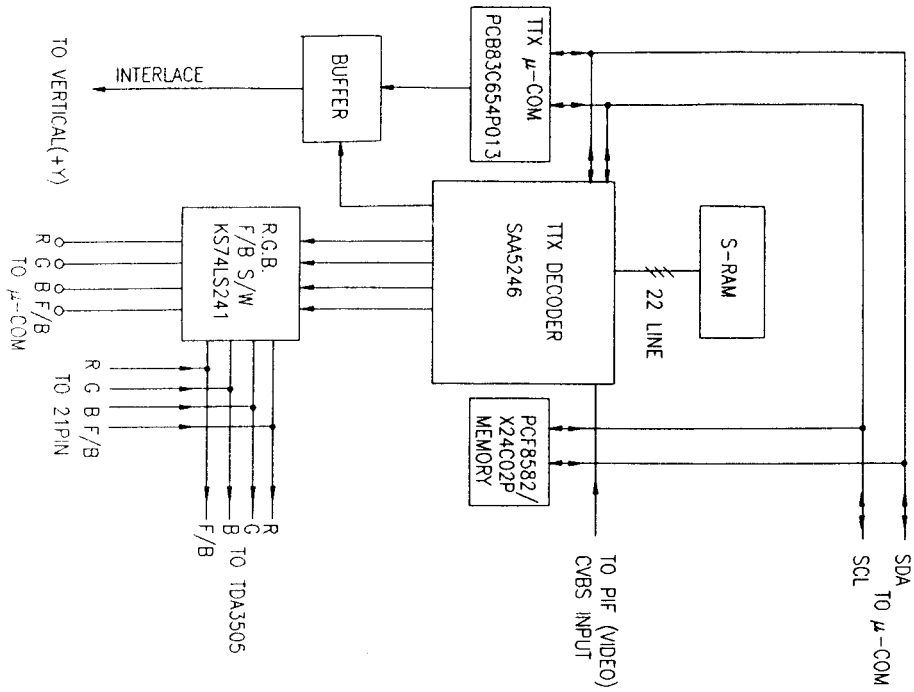
Pin	Description	Pin	Description
1	Vertical output stage	10	Supply
2	Vertical comparator	11	Horizontal output
3	Vertical ramp generator	12	Flyback input pulse
4	Current source	13	Video transmitter identification output
5	Video input	14	Second control loop
6	Vert/Hori sync separator	15	Horizontal oscillator
7		16	Supply
8	First control loop	17	Sandcastle output
9	Ground	18	Coincidence detector

Block Diagram



12. TELETEXT SECTION

1. TTX BLOCK DIAGRAM



2. SEMICONDUCTOR SPECIFICATION

PCB83C654P013

a. μ-COM, TTX (Optition)

Pin	Pin LOW	Pin High
1	LIST mode at power-up	TOP mode at power-up
2	Disable status row	Enable auto non-TOP status row
4	No NVRAM connected	Enable use of NVRAM
5	312/312 Text Composite Sync	312/313 Text Composite Sync
6	Disable programme prompts	Enable programme prompts

b. Pin description

Type : PCB83C654/AC013
Clock Frequency : 12.0 MHz

Pin	Name	Function
1	P10	LINK-Select TOP/LIST mode at POWER-UP
2	P11	LINK-Enable STATUS ROW used in NON-VALID TOP
3	P12	NC
4	P13	LINK-Enable use of NVRAM
5	P14	LINK-Select 312/312 or 312/313 Text Composite Sync
6	P15	LINK-Enable programme prompts
7	P16	SDL:I^2C-bus serial port clock line
8	P17	SDA:I^2C-bus serial port data line
9	RST	Reset circuit
10	P30	PLIN:signal quality detector
11	P31	PDI:power-down imminent input
12	P32	NC
13	P33	PL OUT:signal present
14	P34	PON:Picture On output
15	P35	NC
16	P36	NC
17	P37	NC
18	XTAL2	}Crystal oscillator connection
19	XTAL1	}frequency = 12 MHz
20	Vss	GND:circuit ground potential
21	P20	NC
22	P21	NC
23	P22	NC
24	P23	NC
25	P24	NC
26	P25	NC
27	P26	NC
28	P27	NC
29	PSEN	Open
30	ALE	Open
31	EA	Pull-up to Vdd
32	P07	NC
33	P06	NC
34	P05	NC
35	P04	NC
36	P03	NC
37	P02	NC
38	P01	NC
39	P00	NC
40	Vdd	+5V main power supply

* Notes: All connection marked as NC - no connection MUST be connected to ground to ensure correct operation of the decoder. The exception is pin 12 which must be connected to Vdd.

PCF8582BP (Memory)

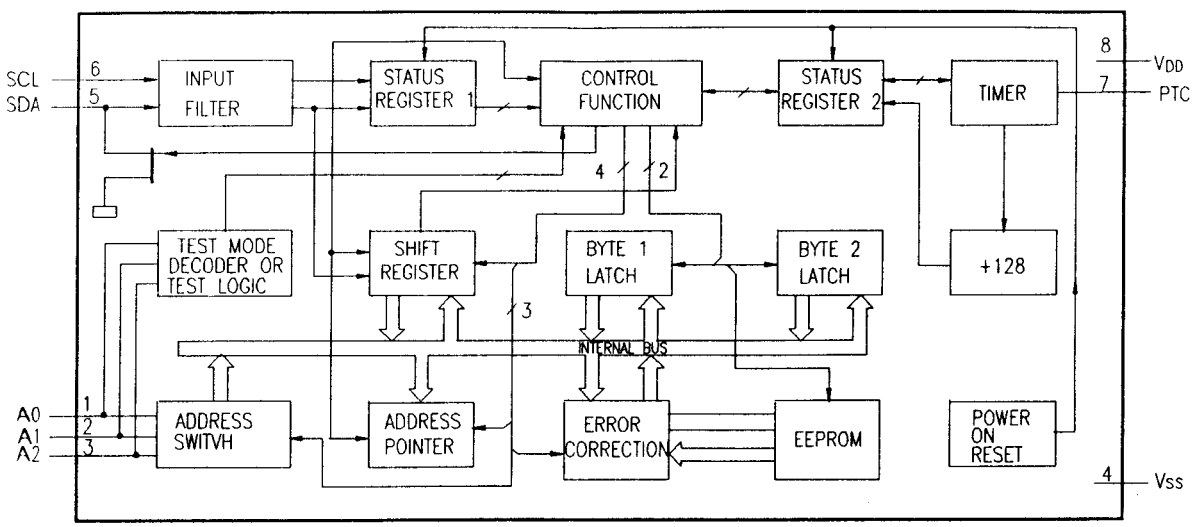
a. General description

The PCA8582B is a 2Kbit (256 x 8 bit) floating gate electrically erasable programmable read only memory (EEPROM). By using an internal redundant storage code it is fault tolerant to single bit errors. This feature dramatically increases reliability compared to conventional EEPROM memories. Power consumption is low due to the full CMOS technology used. The programming voltage is generated on chip using a voltage multiplier.
As data bytes are received and transmitted via the serial I^2C-bus, an eighth pin DIL package is sufficient.
Up to eight PCA8582B devices may be connected to the I^2C-bus. The select chip is accomplished by three address inputs.
Timing of the Erase/Write cycle can be done in two ways: either by connecting an external clock to the "Programming Time Control (PTC)" pin (7) or by using an internal oscillator. In the latter application an RC time constant must be connected to pin 7.

Features

- Non-volatile storage of 2K bits organized as 256 x 8 bits
- High reliability by using a redundant storage code (single bit error correction)
- Only one power supply required
- On chip voltage multiplier for erase/write
- Serial input/output bus (I^2C)
- Automatic word address incrementing
- Low power consumption
- One point erase/write timer
- Power on reset
- Up to 500,000 erase/write cycles per byte
- 10 years non-volatile data retention time
- Infinite number of read cycles
- Pin and address compatible to PCF8570, PCF8571 and PCD8572
- External clock signal possible
- Extended temperature range: –40 to +125°C

b. Block diagram



KM6264AL : S-RAM (Memory)

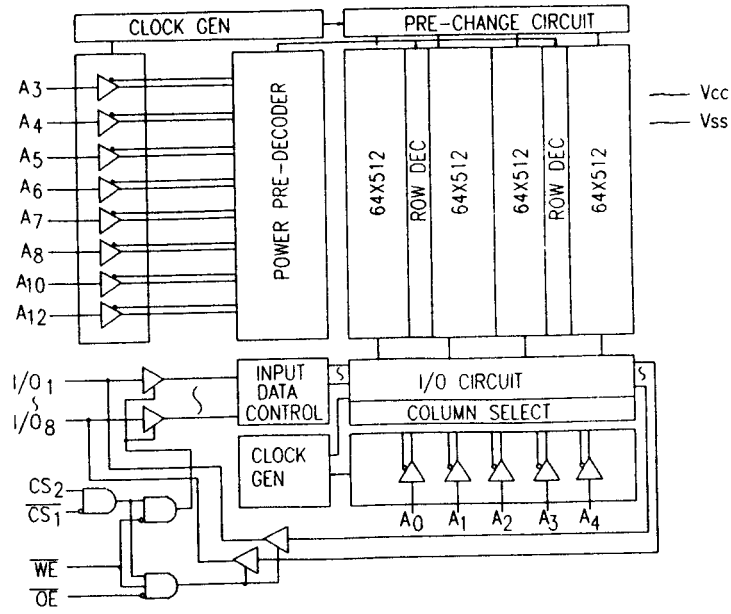
a. General description

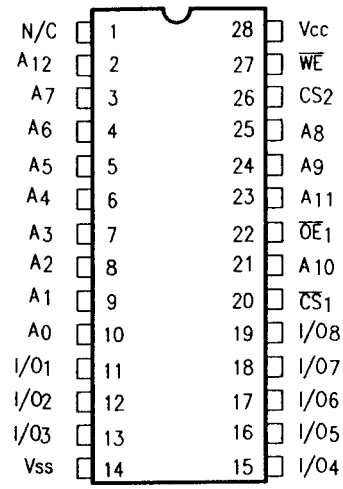
The KM6264A/AL is a 65,536-bit high speed static random access memory organized as 8,192 words by 8 bits. This device is fabricated using advanced SST'S CMOS technology. The KM6264A/AL has an output enable input for precise control of the data outputs. It also has a chip enable inputs for the minimum current power down mode.
The KM6264A/AL has been designed for high speed and low power applications. It is particularly well suited for battery back up non-volatile memory applications.
Two versions are available the KM6264A and KM6264AL. The L-level is specified with lower standby and data retention currents than the standard version. Otherwise the two versions are identical.

Features

- Fast access time 100, 120, 150ns(max.)
- Low standly current: 100μA(max.)
- Low data retention current: 50μA(max.)
- Capability of battery back-up operation
- Data retention voltage: 2.0V(min.)
- Single 5V±10% supply
- TTL compatible inputs and outputs
- Pin compatible with 64K EPROMS
- Fully static operation
- Standard 28 pin DIP
- Common I/O, tri-state output

b. Functional block diagram





Pin configuration

c. Pin configuration and names

A_0 – A_{12}	Address inputs
$\overline{WE}$	Write enable
$\overline{CS1}$, CS2	Chip select
$\overline{OE}$	Output enable
I/O_1 – I/O_8	Data input/output
Vcc	+5V power supply
Vss	Ground

d. Recommanded operating conditions (ta = 0°C to 70°C)

* Note: VIL (min) = –3.0V for ≤ 50ns pulse.

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	Vcc	4.5	5.0	5.5	V
Ground	Vss	0	0	0	V
Input high voltage	VIH	2.2	—	Vcc+0.3	V
Input low voltage	VIL	–0.3	—	0.8	V

Integrated VIP and Teletext (IVT)

a. General description

The integrated VIP and Teletext (IVT) is a teletext decoder (contained within a single chip package) for decoding 625-line based World System Teletext tramsmissions. The teletext decoder hardware is based on the Enhanced Computer Controlled Teletext (ECCT) device (SAA5243) with some additional features; existing ECCT software remains compatible. The Video Input Processor (VIP) section of the device uses new mixed analogue and digital designs for the Data Slicer and the Display Clock Phase Locked Loop functions.
As a result the number of external components is greatly reduced and no critical or adjustable components are required.

Features

- Complete teletext decoder in single 48-pin DIL package
- Single +5V power supply
- Digital Data Slicer and Display Clock Phase Locked Loop reduce peripheral components to a minimum
- Both video and scan related synchronization modes are supported
- 4/8 page acquisition system is software compatible with ECCT
- RGB interface to standard color decoder ICs, push-pull output drive; requires only 2 external resistors
- Data capture performance comparable with SAA5231 (VIP2)
- Software compatibility with ECCT maintained
- Interfaces with 8K x 8-bit static RAM
- Optional storage of packet 24 in the display memory
- Packet 8/30/2 mapped to a different extension chapter as an aid for VCR programming applications

b. Quick reference data

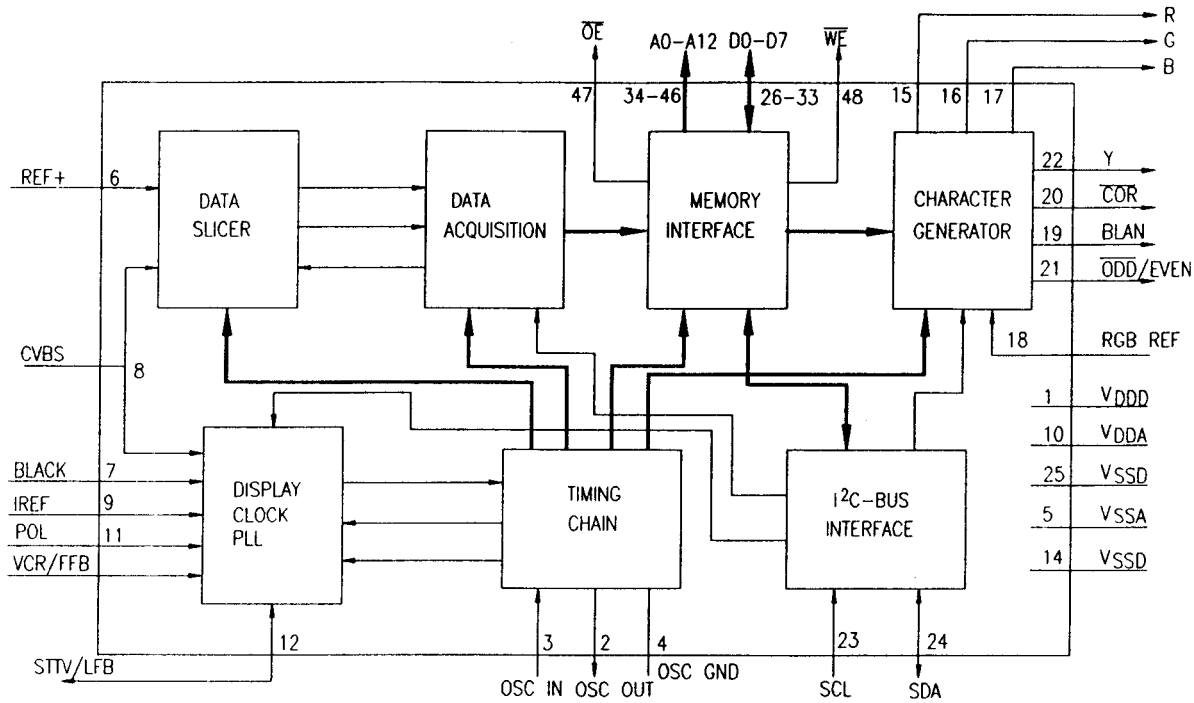
Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	VDD	4.5	5	5.5	V
Supply current	IDD	—	60	120	mA
Sync amplitude	Vsyn	0.1	0.3	0.6	V
Video amplitude	Vvid	0.7	1	1.4	V
Crystal frequency	fXTAL	—	27	—	MHz
Operating ambient temperature range	Tamb	-20	—	+70	°C

c. Pinning description

Pin	Name	Description
1	VDDD	+5V supply to the digital sections of the device.
2	OSCOUT	27MHz crystal oscillator output.
3	OSCIN	27MHz crystal oscillator input.
4	OSCGND	Crystal oscillator ground, 0V.
5	VSSA	Analogue ground, 0V.
6	REF+	Positive reference voltage for the ADC. If necessary, the pin should be connected to analogue +5V via decoupling components.
7	BLANK	Video black level storage pin, connected to analogue ground via a 100nF capacitor.
8	CVBS	Composite video input pin. A positive-going 1V peak-to-peak input is required, connected via a 100nF capacitor.
9	Iref	Reference current input pin, connected to analogue ground via a 27KΩ resistor.
10	VDDA	+5V supply to the analogue sections of the device.
11	POL	STTV/LFB/FFB polarity select pin.
12	STTV/LFB	Sync to TV output pin/line flyback input pin, function controlled by an internal register bit.
13	$\overline{\text{VCR}}$/FFB	PLL time constant switch/field flyback input pin, function control by an internal register bit.
14	VSSD	Connected to VSSD for normal operation.
15	R	Dot rate character output of the RED colour information.
16	G	Dot rate character output of the GREEN colour information.
17	B	Dot rate character output of the BLUE colour information.
18	RGBREF	DC voltage to define the output high level on the RGB pins.
19	BLAN	Dot rate fast blanking output. HIGH for text and LOW for picture.

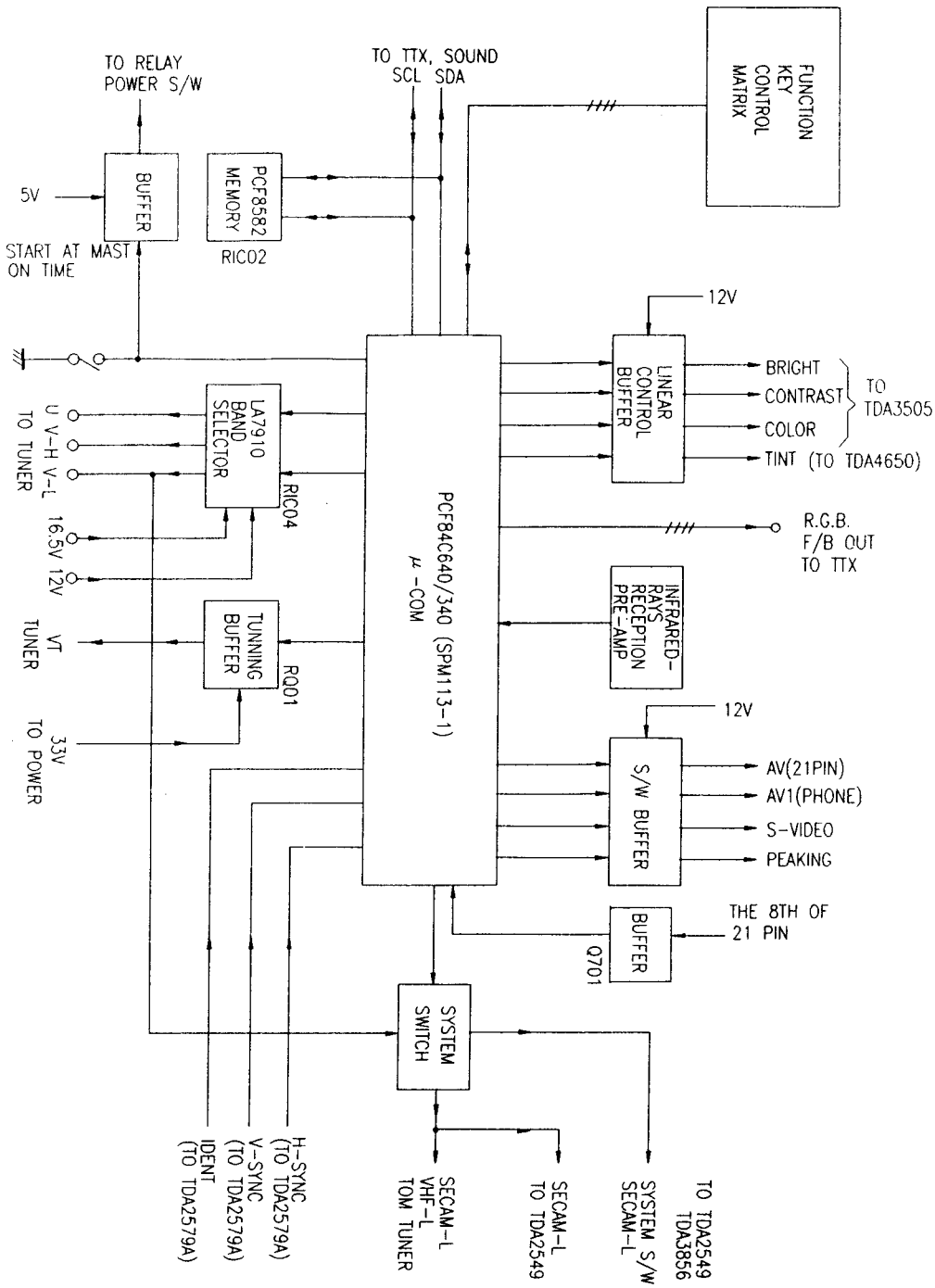
Pin	Name	Description
20	$\overline{COR}$	Programmable output to provide contrast reduction of the TV picture for mixed text and picture displays or when viewing newsflash/subtitle pages.
21	$\overline{ODD/EVEN}$	25Hz output synchronized with the CVBS input's field sync pulses to produce a non-interlaced display by adjustment of the vertical deflection currents.
22	Y	Dot rate character output of teletext foreground colour information. Open drain output.
23	SCL	Serial clock input for I2C-bus. It can still be driven HIGH during power-down of the device.
24	SDA	Serial data port for the I^2C-bus. Open drain output. It can still be driven HIGH during power-down of the device.
25	VSSD	Digital ground, 0V.
26-33	D0-D7	Data lines for the page RAM.
34-46	A0-A12	Address lines for the page RAM.
47	$\overline{OE}$	Output enable to the page RAM.
48	$\overline{WE}$	Write enable to the page RAM.

d. IVT block diagram



13. μ-COM (REMOCON) SECTION

1. μ-COM BLOCK DIAGRAM



2. SEMICONDUCTOR SPECIFICATION (LA7910)

The LA7910 is an IC for tuner band selection of electronic tuning type television set. This IC is used for producing the VHF channel "L" band power supply/UHF channel "H" power supply/UHF channel power supply for tuner and the CATV power supply according to the band select signal of 2 inputs.

Functions

- VHF "L" band power supply output.
- VHF "H" band power supply output.
- UHF power supply output.
- CATV power supply output.

Features

- 2 inputs and 4 outputs.
- Output low saturation voltage: 0.25V typ., Io=60mA.
- Compact 9-pin single-end package.

Maximum ratings at Ta=25°C

Parameter			Unit
Maximum supply voltage	V_9 max	15	V
Maximum load current	I_1 max, I_2 max, I_7 max, I_8 max	–60	mA
Maximum supply current Vcc2	I_6 max	10	mA
Allowable power dissipation	Pd max	200	mW
Operating temperature	Topg	–20 to +85	°C
Storage temperature	Tstg	–55 to +125	°C
Input current	I_3 max, I_4 max	2	mA

Electrical characteristics at Ta=25°C

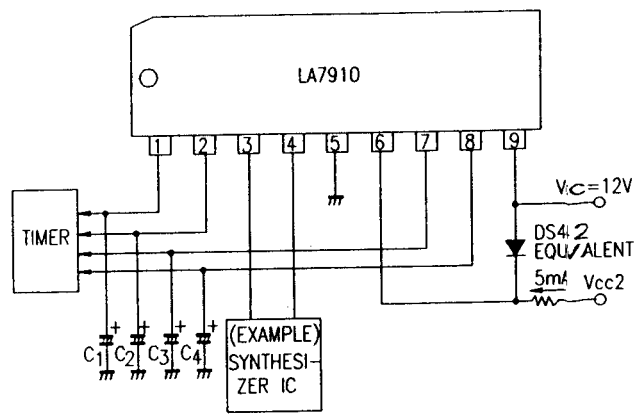
Parameter			Min.	Typ.	Max.	Unit
Dissipation current	I_1, I_2, I_7, I_8				60	mA
Output saturation voltage		V_9=12V, I_6=5mA, Io=60mA	0	0.25	0.7	V
Input "H" level threshold voltage	VTH				3.0	V
Input "L" level threshold voltage	VTL		0.8			V
Output leak current	I_1, I_2, I_7, I_8	Ta≤70°C			50	μA

Truth table

Input		Output			
Pin 3	Pin 4	Pin 1	Pin 2	Pin 7	Pin 8
L	L	H	Z	Z	Z
H	L	Z	H	Z	Z
L	H	Z	Z	H	Z
H	H	Z	Z	Z	H

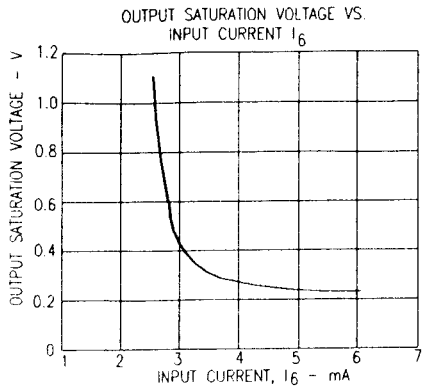
Z: High inpedance
Input threshold voltage:
VTL=0.8V, VTH=3V.

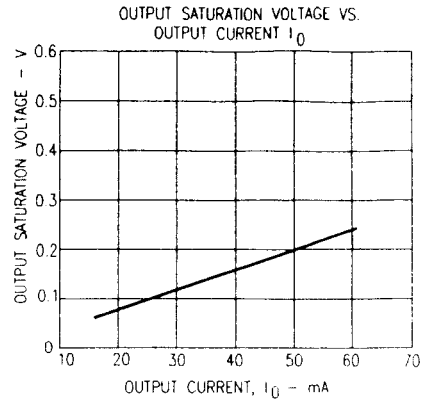
Application circuit



Proper cares in using the IC

1. When using a capacitive load, connect a diode across pins 6 and 9 as shown the above.
2. The value of load capacitors C1, C2, C3, C4 must not exceed 22μF.





3. REMOCON SECTION

Features

SPM113 is a television receiver control system, based on the PCA84C641 microcontroller. It is voltage synthesis tuning (VST) system with On-Screen Disply (OSD) of the relevant control functions. "German" stereo sound system are supported. The analogue video controls are controlled by the on chip digital to analogue convertors.
This system is an independent colour standard and can be used all over the world. The SPM113 package supports external teletext processors by means of a CTV 9XX interface.

- VST tuning system
- On-Screen display of all control functions
- Off-Screen LED indication for stand by mode and for stereo signal available
- "German" stereo sound control
- Video source switching
- VTR time constant control
- Non-Volatile memory for storage of preferred programs and personal presets
- CTV 9XX teletext interface
- RC-5 remote control decoding
- Local keyboard decoding
- World multi system control

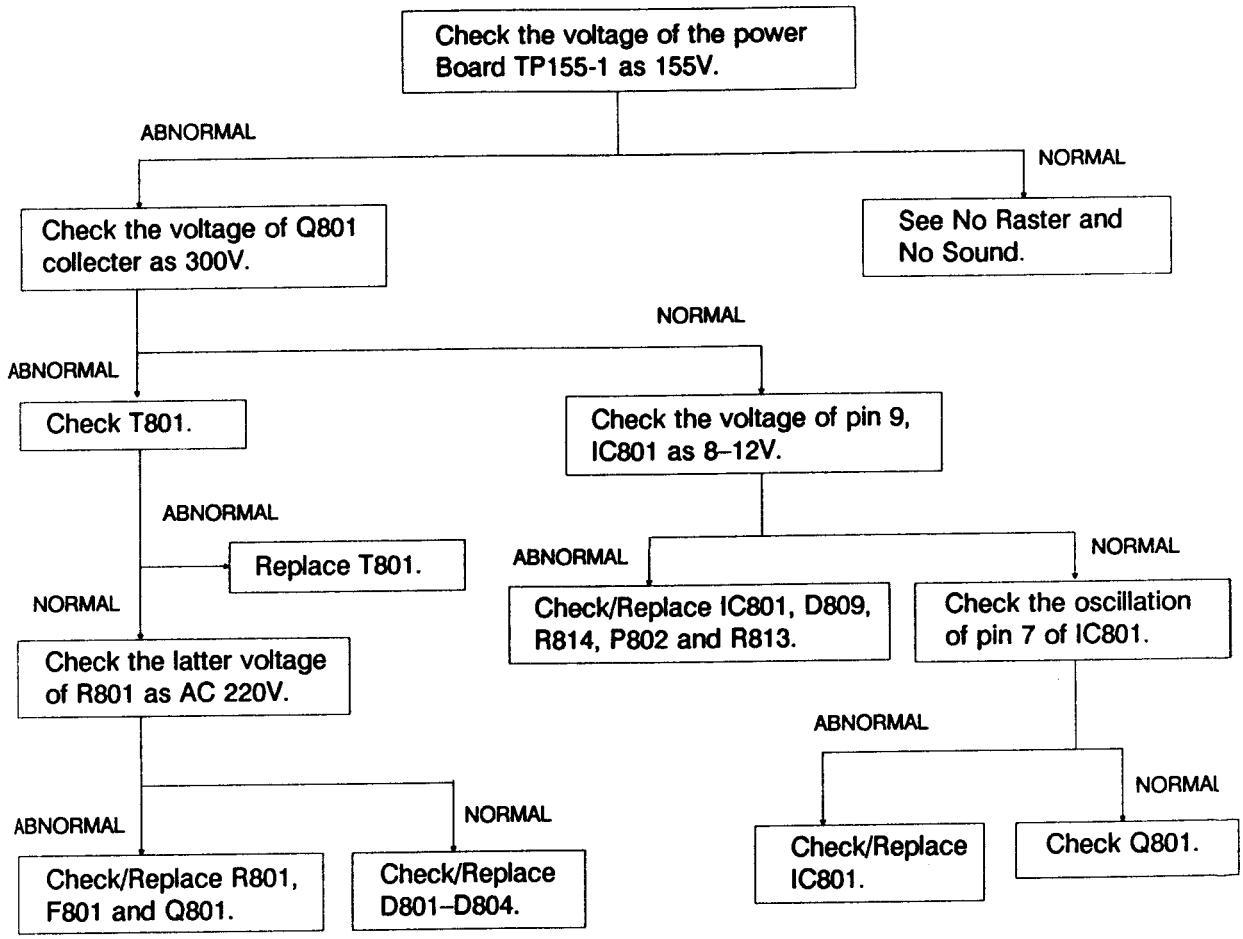
Pin description

Pin no	Pin name	Description	Pin no	Pin name	Description
1	VTUNN	tuning voltage control output	22	RED	OSD red output
2	VOL	Not used	23	GREEN	OSD green output
3	BRI	brightness control output	24	BLUE	OSD blue output
4	COL	colour control output	25	FBL	OSD fast blanking output
5	CON	contrast control output	26	HSYNC	horizontal synchronization input
6	HUE	hue control output	27	VSYNC	vertical synchronization input
7	BND-0	band-switch output 0	28	DOSC OUT	LC oscillator output for OSD
8	BND-1	band-switch output 1	29	DOSC IN	LC oscillator input for OSD
9	AFC	analogue AFC sense input	30	TEST	test input; connected to ground
10	peri 0	AV switching	31	XTAL 1	oscillator input; 10M crystal
11	peri 1	RGB switching	32	XTAL 2	oscillator output
12	CVBS in	CVBS status input	33	RESETN	power-ON reset input/output
13	P0	S-Video switching	34	IDENT	horizontal coincidence input
14	P1	AV-1 switching	35	RMOT	remote control input
15	KEYB 2	keyboard scan line input/output	36	PEAK	Peaking on/off switching
16	KEYB 3		37	SYS 1	system output 1
17	KEYB 4		38	SYS 2	system output 0
18	KEYB 5		39	SCL	I2C-bus clock signal input/output
19	KEYB 6		40	SDA	I2C-bus data signal input/output
20	MDSTR	system mode strobe output	41	STDBY	stand by/on control input/output
21	VSS	ground	42	Vdd	+5V supply voltage input

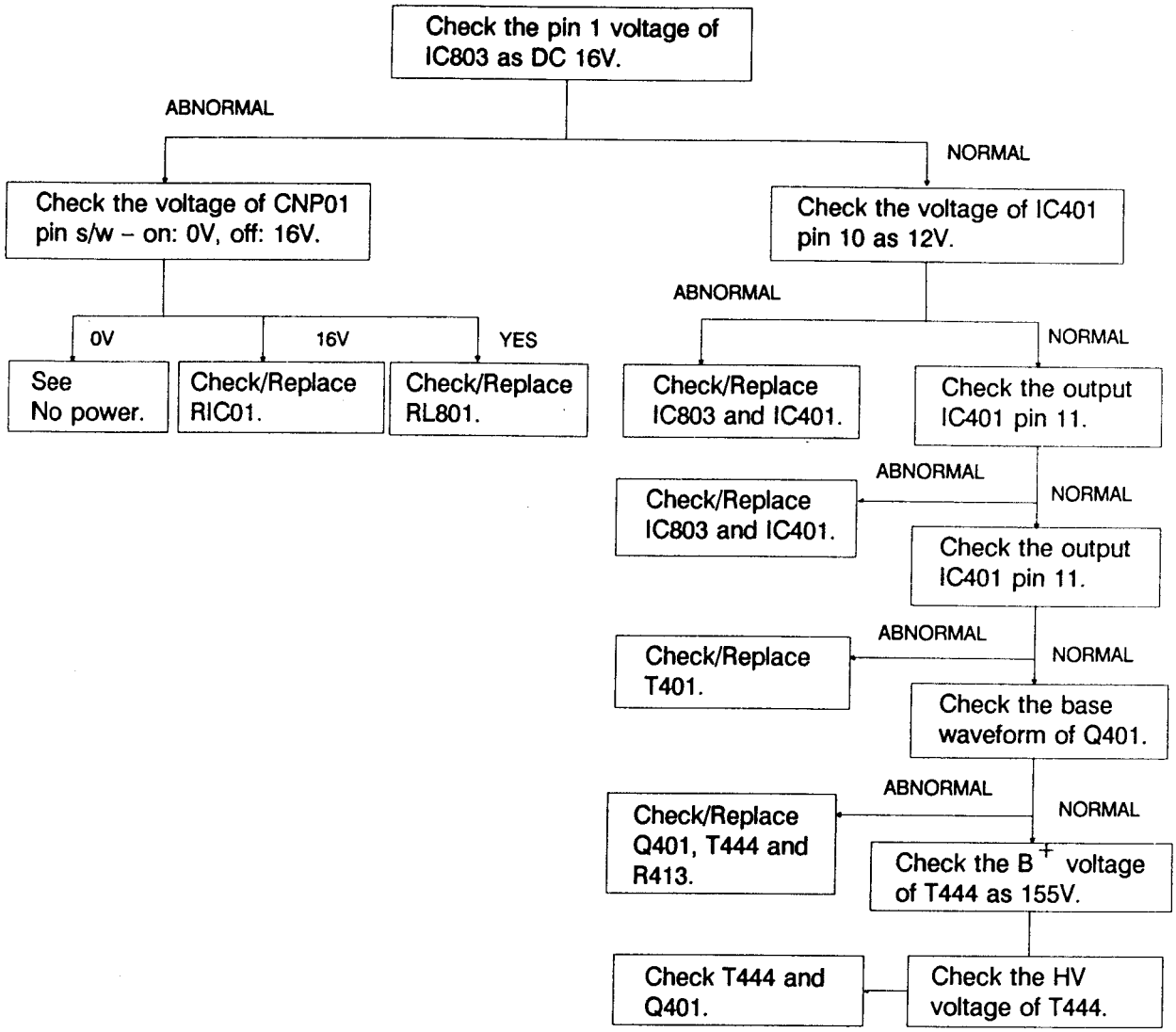
14. TROBLESHOOTING CHARTS

The following charts are devoted to the troubleshooting which, if followed carefully, will assist you in tracking down a fault to the correct stage.
In order to utilize the charts (fault trees), first establish the complains, e.g. - No Raster and No Sound, etc. Locate the chart applicable and them, progress through the various alternatives until a final block indicates the defective components or stages.

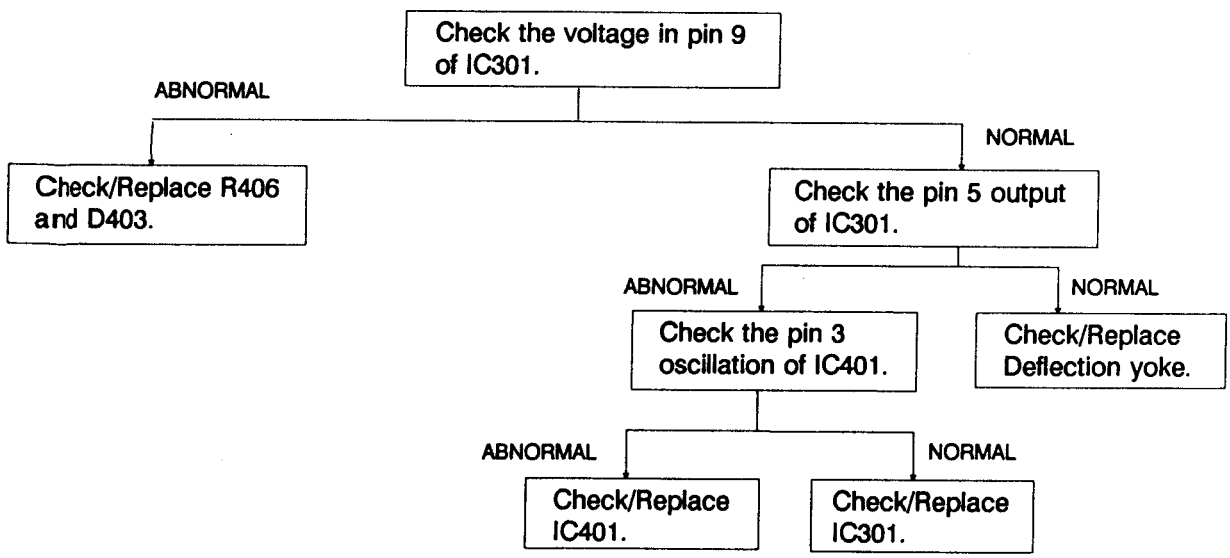
1. NO POWER



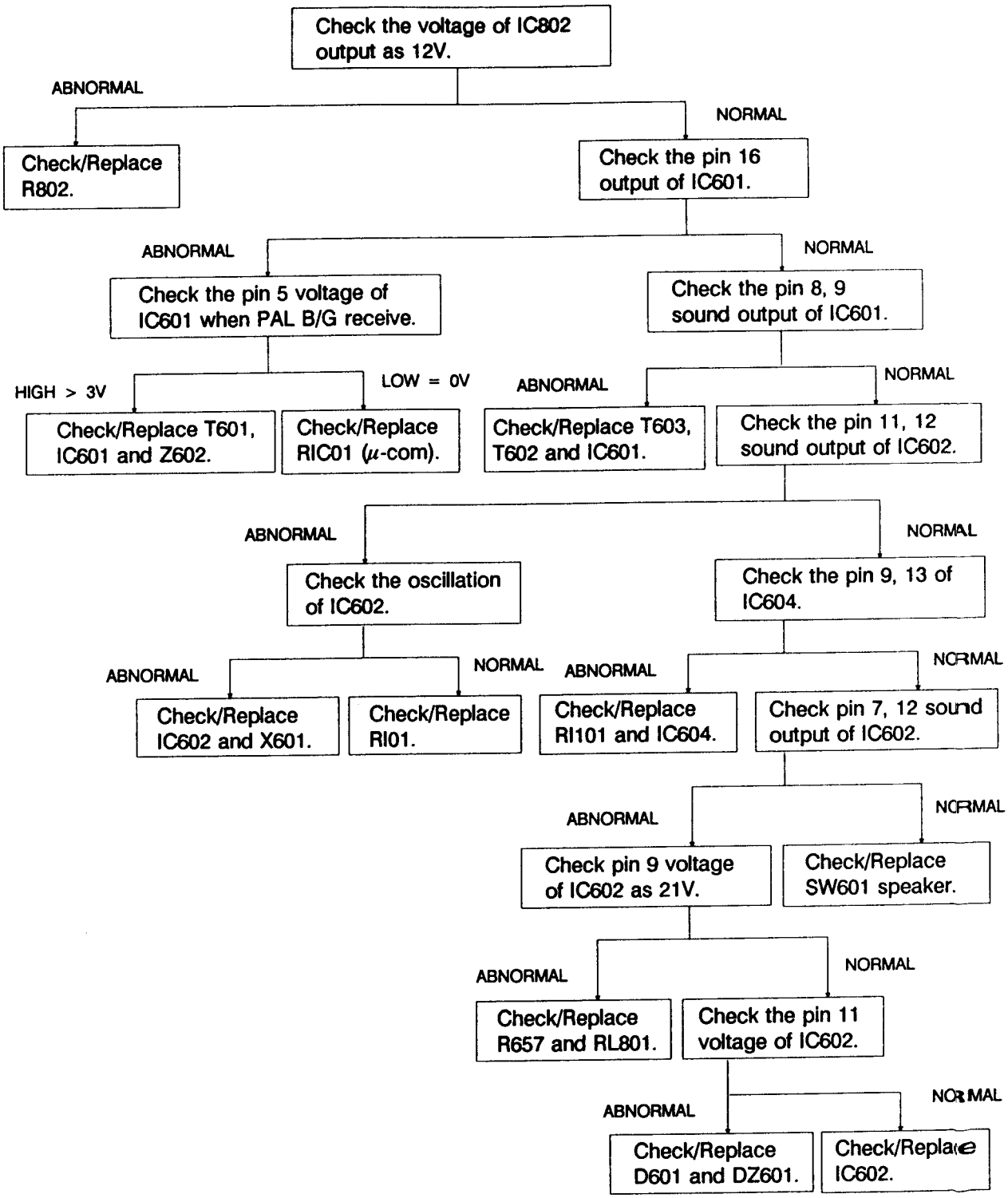
2. NO RASTER AND NO SOUND



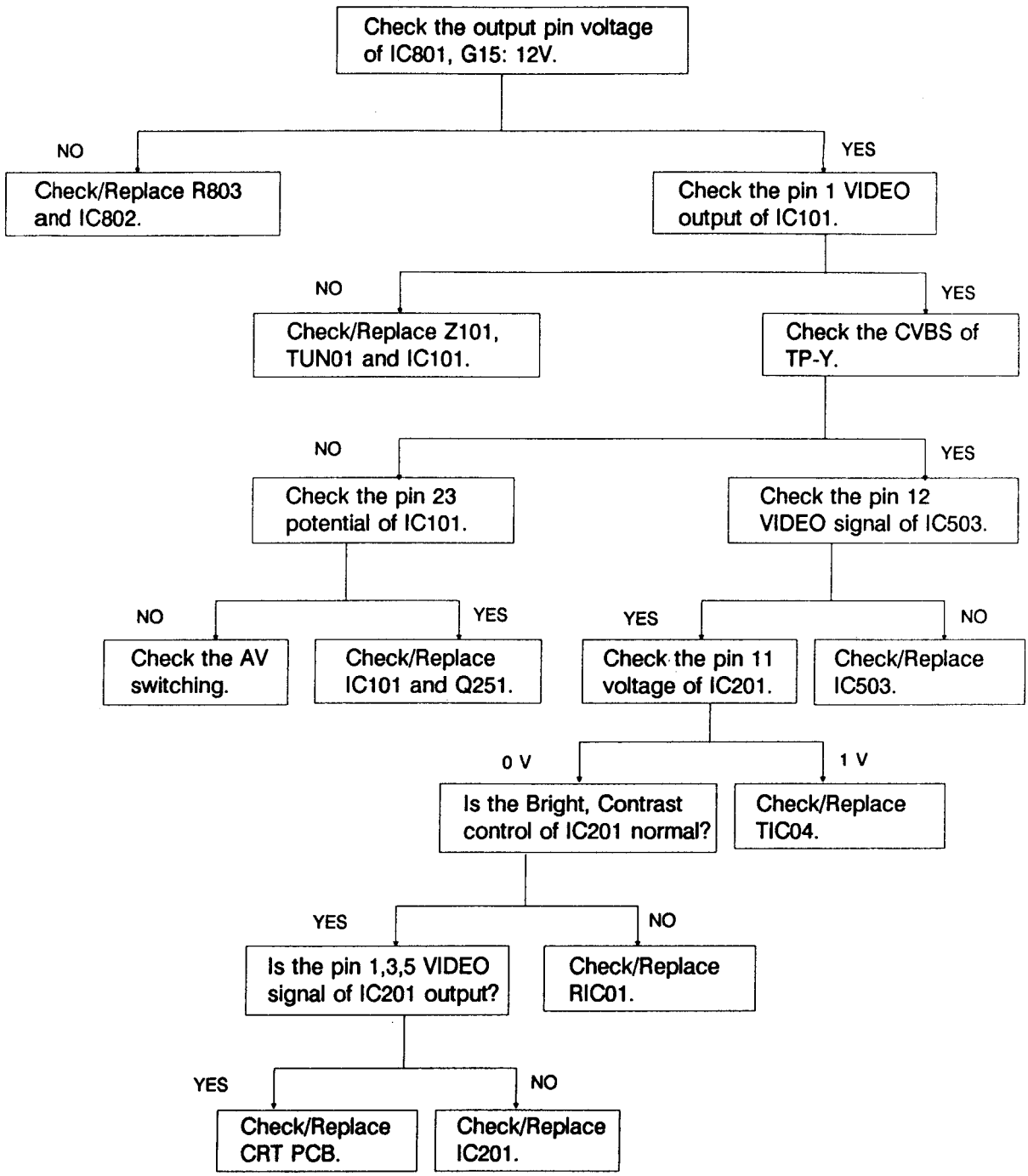
3. NO VERTICAL SCAN (ONE HORIZ. LINE RASTERY)



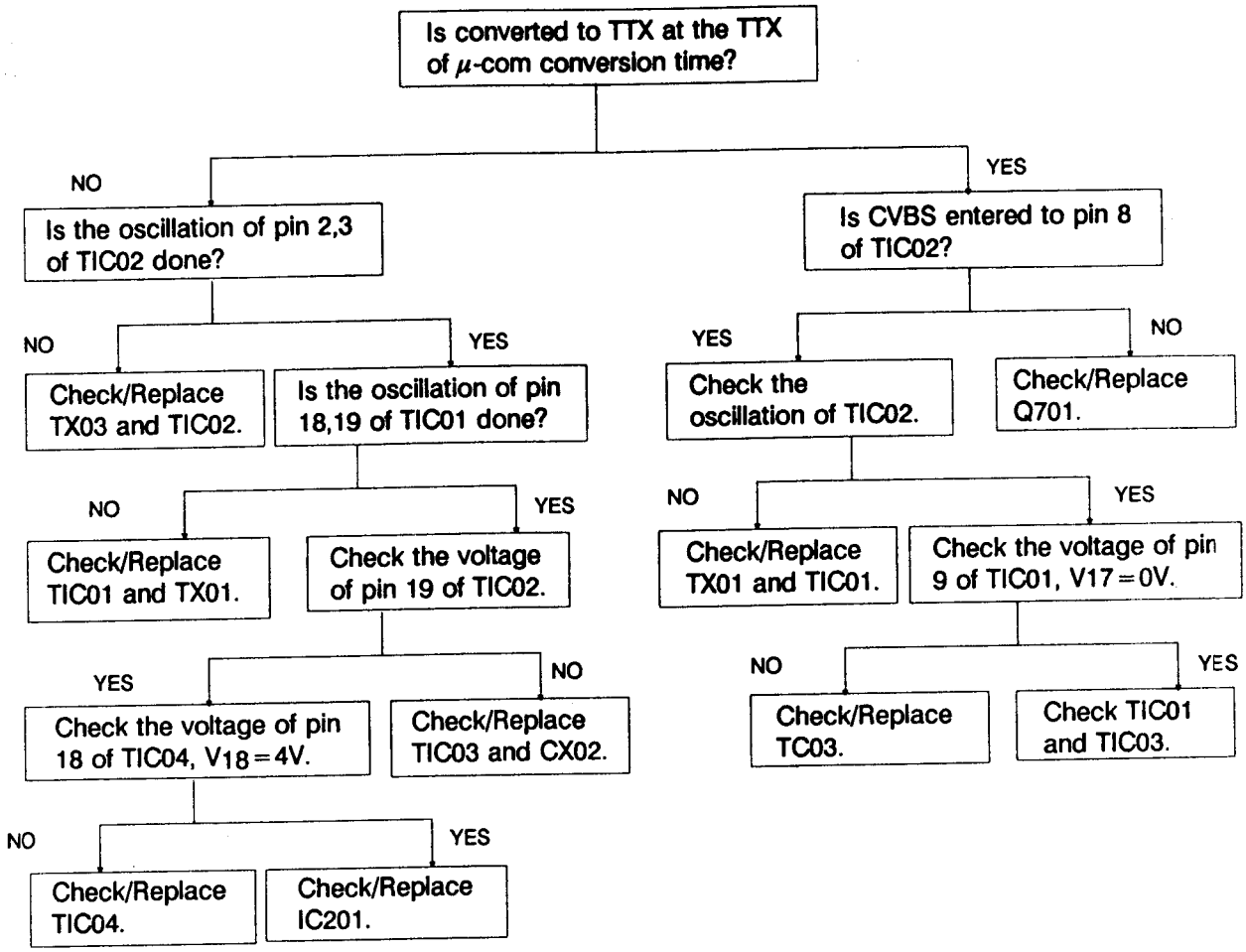
4. NO SOUND (PICTURE ON)



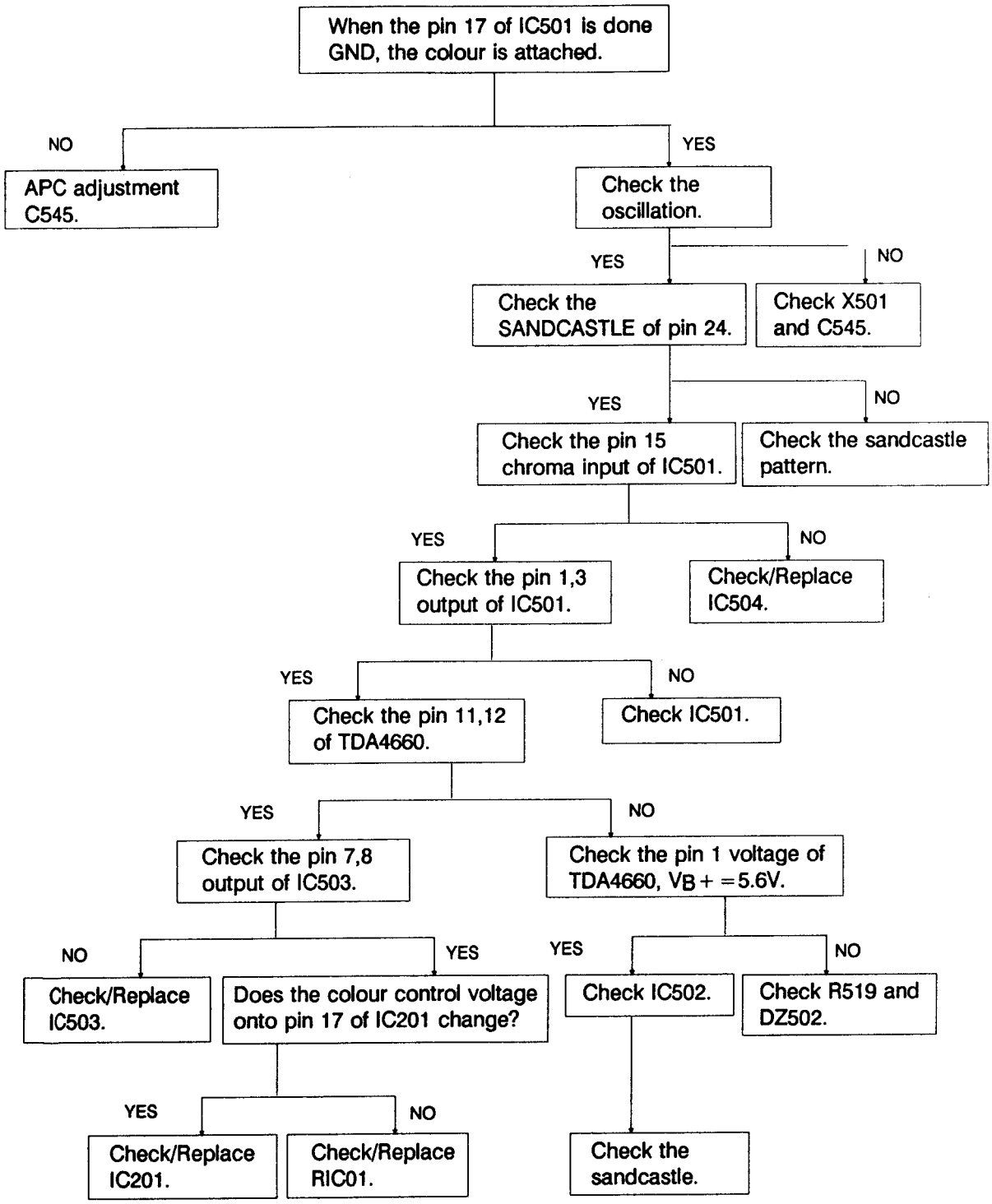
5. NO PICTURE (NO SOUND)



6. NO TTX (THE TV OPERATING IS O.K)



7. NO COLOR


When the pin 17 of IC501 is done GND, the colour is attached.
NO
YES
APC adjustment C545.
Check the oscillation.
YES
NO
Check the SANDCASTLE of pin 24.
Check X501 and C545.
YES
NO
Check the pin 15 chroma input of IC501.
Check the sandcastle pattern.
YES
NO
Check the pin 1,3 output of IC501.
Check/Replace IC504.
YES
NO
Check the pin 11,12 of TDA4660.
Check IC501.
YES
NO
Check the pin 7,8 output of IC503.
Check the pin 1 voltage of TDA4660, VB+ =5.6V.
NO
YES
YES
NO
Check/Replace IC503.
Does the colour control voltage onto pin 17 of IC201 change?
Check IC502.
Check R519 and DZ502.
YES
NO
Check/Replace IC201.
Check/Replace RIC01.
Check the sandcastle.

15. CHASSIS REPLACEMENT PARTS LIST

ABBREVIATIONS :

CC	C-CERAMIC	RC	R-COMPOSITION
CE	C-ELECTROLYTIC	RD	R-CARBON
CFS	C-M,POLYESTER	RF	R-FUSIBLE
CK	C-CERAMIC,HK	RM	R-METAL,FILM
CQ	C-POLYPROPYLENE,POLYESTE	RP	R-CEMENT WIRE
CS	C-TANTALIUM,SOLID	RS	R-METAL,OXIDE

NOTE : The items with "*" are usually out of stock since they are seldom required for the routine service. There may be some anticipated delay when you order these items.

S.N.A. = Service Not Available , L/C = Local Purchase

The components identified by mark '**' are critical for safety. Replace only with Supplier part number specified.

When indicating parts by location number, Please include the PWB names (PWB = Printed Writing Board)

Loc No	Supplier Parts No.	Specification
	A S S Y - P W B M A I N	
	*3T30-01431-120	CX7226WT/SGX
PWB	33004-146-181	S60TOP <S.N.A>
	RESISTORS	
AR01	31018-177-750	RD 1/8T 75-J
AR02	31018-177-102	RD 1/8T 1K-J
AR03	31018-177-102	RD 1/8T 1K-J
D605	31018-177-204	RD 1/8T 200K-J
PR01	31018-177-750	RD 1/8T 75-J
PR02	31018-177-750	RD 1/8T 75-J
R101	31018-177-472	RD 1/8T 4.7K-J
R103	31018-177-122	RD 1/8T 1.2K-J
R105	31018-177-101	RD 1/8T 100-J
R106	31018-177-560	RD 1/8T 56-J
R107	31018-177-391	RD 1/8T 390-J
R109	31018-177-102	RD 1/8T 1K-J
R110	31018-177-222	RD 1/8T 2.2K-J
R112	31018-177-474	RD 1/8T 470K-J
R114	31018-177-223	RD 1/8T 22K-J
R117	31018-177-223	RD 1/8T 22K-J
R118	31018-177-153	RD 1/8T 15K-J
R119	31018-177-104	RD 1/8T 100K-J
R120	31018-177-302	RD 1/8T 3K-J
R121	31018-177-104	RD 1/8T 100K-J
R122	31018-177-104	RD 1/8T 100K-J
R123	31018-177-333	RD 1/8T 33K-J
R124	31018-177-124	RD 1/8T 120K-J
R125	31018-177-104	RD 1/8T 100K-J
R126	31018-177-511	RD 1/8T 510-J
R127	31018-177-330	RD 1/8T 33-J
R128	31018-177-563	RD 1/8T 56K-J
R130	31018-177-102	RD 1/8T 1K-J
R131	31018-377-101	RD 1/2T 100-J
R133	31018-177-472	RD 1/8T 4.7K-J
R134	31018-177-472	RD 1/8T 4.7K-J

Loc No	Supplier Parts No.	Specification
R135	31018-177-682	RD 1/8T 6.8K-J
R136	31018-177-682	RD 1/8T 6.8K-J
R137	31018-177-821	RD 1/8T 820-J
R150	31018-177-470	RD 1/8T 47-J
R201	31018-177-750	RD 1/8T 75-J
R202	31018-177-750	RD 1/8T 75-J
R203	31018-177-750	RD 1/8T 75-J
R204	31018-177-161	RD 1/8T 160-J
R205	31018-177-101	RD 1/8T 100-J
R206	31018-177-101	RD 1/8T 100-J
R207	31018-177-101	RD 1/8T 100-J
R211	31018-177-683	RD 1/8T 68K-J
R212	31018-177-103	RD 1/8T 10K-J
R213	31018-177-153	RD 1/8T 15K-J
R214	31018-177-123	RD 1/8T 12K-J
R215	31018-177-332	RD 1/8T 3.3K-J
R216	31018-177-303	RD 1/8T 30K-J
R217	31018-177-223	RD 1/8T 22K-J
R218	31018-177-472	RD 1/8T 4.7K-J
R219	31018-177-331	RD 1/8T 330-J
R220	31018-177-221	RD 1/8T 220-J
R251	31018-177-473	RD 1/8T 47K-J
R252	31018-177-333	RD 1/8T 33K-J
R253	31018-177-102	RD 1/8T 1K-J
R254	31018-177-750	RD 1/8T 75-J
R255	31018-177-272	RD 1/8T 2.7K-J
R256	31018-177-122	RD 1/8T 1.2K-J
R257	31018-177-153	RD 1/8T 15K-J
R258	31018-277-182	RD 1/4T 1.8K-J
R260	31018-177-333	RD 1/8T 33K-J
R261	31018-177-153	RD 1/8T 15K-J
R262	31018-177-272	RD 1/8T 2.7K-J
R263	31018-177-561	RD 1/8T 560-J
R265	31018-377-102	RD 1/2T 1K-J
R266	31018-177-391	RD 1/8T 390-J
R267	31018-177-750	RD 1/8T 75-J
R501	31018-177-122	RD 1/8T 1.2K-J
R502	31018-177-151	RD 1/8T 150-J
R504	31018-177-431	RD 1/8T 430-J

Loc No	Supplier Parts No.	Specification
R505	31018-177-273	RD 1/8T 27K-J
R507	31018-177-682	RD 1/8T 6.8K-J
R508	31018-177-221	RD 1/8T 220-J
R509	31018-177-101	RD 1/8T 100-J
R511	31018-177-272	RD 1/8T 2.7K-J
R512	31018-177-203	RD 1/8T 20K-J
R513	31018-177-821	RD 1/8T 820-J
R514	31018-177-122	RD 1/8T 1.2K-J
R515	31018-177-301	RD 1/8T 300-J
R516	31018-177-472	RD 1/8T 4.7K-J
R517	31018-177-472	RD 1/8T 4.7K-J
R518	31018-177-333	RD 1/8T 33K-J
R519	31018-377-561	RD 1/2T 560-J
R520	31018-177-105	RD 1/8T 1M-J
R521	31018-177-103	RD 1/8T 10K-J
R522	31018-177-123	RD 1/8T 12K-J
R523	31018-177-101	RD 1/8T 100-J
R524	31018-177-151	RD 1/8T 150-J
R525	31018-177-222	RD 1/8T 2.2K-J
R526	31018-177-101	RD 1/8T 100-J
R528	31018-177-361	RD 1/8T 360-J
R529	31018-177-472	RD 1/8T 4.7K-J
R530	31018-177-222	RD 1/8T 2.2K-J
R531	31018-177-333	RD 1/8T 33K-J
R532	31018-277-222	RD 1/4T 2.2K-J
R534	31018-177-472	RD 1/8T 4.7K-J
R535	31018-177-682	RD 1/8T 6.8K-J
R536	31018-177-331	RD 1/8T 330-J
R537	31018-177-331	RD 1/8T 330-J
R538	31018-177-513	RD 1/8T 51K-J
R601	31018-177-561	RD 1/8T 560-J
R602	31018-177-561	RD 1/8T 560-J
R603	31018-177-471	RD 1/8T 470-J
R604	31018-177-471	RD 1/8T 470-J
R605	31018-177-101	RD 1/8T 100-J
R606	31018-177-513	RD 1/8T 51K-J
R607	31018-177-102	RD 1/8T 1K-J
R608	31018-177-332	RD 1/8T 3.3K-J
R609	31018-177-101	RD 1/8T 100-J
R610	31018-177-513	RD 1/8T 51K-J
R611	31018-177-513	RD 1/8T 51K-J
R612	31018-177-513	RD 1/8T 51K-J
R613	31018-177-471	RD 1/8T 470-J
R614	31018-177-471	RD 1/8T 470-J
R615	31018-177-473	RD 1/8T 47K-J
R616	31018-177-473	RD 1/8T 47K-J
**R617	31046-467-101	RS 1T 100-J(AUTO)
R618	31018-177-473	RD 1/8T 47K-J
R619	31018-177-473	RD 1/8T 47K-J
R620	31018-177-513	RD 1/8T 51K-J
R621	31018-177-513	RD 1/8T 51K-J
R622	31018-177-102	RD 1/8T 1K-J
R623	31018-177-102	RD 1/8T 1K-J
R624	31018-177-102	RD 1/8T 1K-J
R625	31018-177-101	RD 1/8T 100-J
R626	31018-177-513	RD 1/8T 51K-J
R627	31018-177-101	RD 1/8T 100-J

Loc No	Supplier Parts No.	Specification
R628	31018-177-392	RD 1/8T 3.9K-J
R629	31018-177-392	RD 1/8T 3.9K-J
R630	31018-177-513	RD 1/8T 51K-J
R631	31018-277-471	RD 1/4T 470-J
R632	31018-177-202	RD 1/8T 2K-J
R633	31018-177-202	RD 1/8T 2K-J
R634	31018-177-202	RD 1/8T 2K-J
R635	31018-277-471	RD 1/4T 470-J
R636	31018-177-513	RD 1/8T 51K-J
R637	31018-177-513	RD 1/8T 51K-J
R640	31018-177-513	RD 1/8T 51K-J
R701	31018-177-104	RD 1/8T 100K-J
R702	31018-177-223	RD 1/8T 22K-J
**R801	31046-567-470	RS 2T 47-J(AUTO)
**R802	31059-002-130	RF 1/2P 0.47-K
**R803	31059-002-130	RF 1/2P 0.47-K
**R804	31046-567-470	RS 2T 47-J(AUTO)
**R805	31039-547-330	RW 5J 33-J
RR01	31018-177-332	RD 1/8T 3.3K-J
RR03	31018-277-103	RD 1/4T 10K-J
RR04	31018-177-683	RD 1/8T 68K-J
RR05	31018-277-472	RD 1/4T 4.7K-J
RR08	31018-177-562	RD 1/8T 5.6K-J
RR09	31018-177-113	RD 1/8T 11K-J
RR10	31018-177-182	RD 1/8T 1.8K-J
RR11	31018-177-272	RD 1/8T 2.7K-J
RR12	31018-177-472	RD 1/8T 4.7K-J
RR13	31018-177-103	RD 1/8T 10K-J
RR14	31018-177-362	RD 1/8T 3.6K-J
RR15	31018-177-682	RD 1/8T 6.8K-J
RR16	31018-177-103	RD 1/8T 10K-J
RR18	31018-177-222	RD 1/8T 2.2K-J
RR19	31018-177-222	RD 1/8T 2.2K-J
RR21	31018-377-471	RD 1/2T 470-J
RR22	31018-177-333	RD 1/8T 33K-J
RR23	31018-177-472	RD 1/8T 4.7K-J
RR24	31018-177-102	RD 1/8T 1K-J
RR25	31018-177-102	RD 1/8T 1K-J
RR26	31018-177-102	RD 1/8T 1K-J
RR27	31018-177-102	RD 1/8T 1K-J
RR29	31018-177-223	RD 1/8T 22K-J
RR30	31018-177-102	RD 1/8T 1K-J
RR31	31018-177-472	RD 1/8T 4.7K-J
RR32	31018-177-473	RD 1/8T 47K-J
RR34	31018-177-333	RD 1/8T 33K-J
RR36	31018-177-472	RD 1/8T 4.7K-J
RR37	31018-177-102	RD 1/8T 1K-J
RR38	31018-177-102	RD 1/8T 1K-J
RR39	31018-177-333	RD 1/8T 33K-J
RR40	31018-177-102	RD 1/8T 1K-J
RR41	31018-177-472	RD 1/8T 4.7K-J
RR43	31018-177-472	RD 1/8T 4.7K-J
RR44	31018-177-472	RD 1/8T 4.7K-J
RR45	31018-177-101	RD 1/8T 100-J
RR46	31018-177-101	RD 1/8T 100-J
RR47	31018-177-101	RD 1/8T 100-J
RR48	31018-177-101	RD 1/8T 100-J

Loc No	Supplier Parts No.	Specification
RR54	31018-177-333	RD 1/8T 33K-J
RR55	31018-177-472	RD 1/8T 4.7K-J
RR56	31018-177-101	RD 1/8T 100-J
RR57	31018-177-101	RD 1/8T 100-J
RR60	31018-177-103	RD 1/8T 10K-J
RR61	31018-177-103	RD 1/8T 10K-J
RR62	31018-177-223	RD 1/8T 22K-J
RR63	31018-177-223	RD 1/8T 22K-J
RR64	31018-177-472	RD 1/8T 4.7K-J
RR66	31018-377-331	RD 1/2T 330-J
RR69	31018-177-472	RD 1/8T 4.7K-J
RR71	31018-177-222	RD 1/8T 2.2K-J
SR01	31018-177-750	RD 1/8T 75-J
SR02	31018-177-750	RD 1/8T 75-J
SR03	31018-177-470	RD 1/8T 47-J
SR04	31018-177-222	RD 1/8T 2.2K-J
SR05	31018-177-562	RD 1/8T 5.6K-J
SR06	31018-177-562	RD 1/8T 5.6K-J
SR704	31018-177-103	RD 1/8T 10K-J
TG06	31018-377-221	RD 1/2T 220-J
TR02	31018-177-221	RD 1/8T 220-J
TR06	31018-177-472	RD 1/8T 4.7K-J
TR08	31018-277-100	RD 1/4T 10-J
TR09	31018-177-152	RD 1/8T 1.5K-J
TR11	31018-177-273	RD 1/8T 27K-J
TR12	31018-177-682	RD 1/8T 6.8K-J
TR13	31018-177-152	RD 1/8T 1.5K-J
TR14	31018-177-101	RD 1/8T 100-J
TR15	31018-177-682	RD 1/8T 6.8K-J
TR16	31018-177-101	RD 1/8T 100-J
TR17	31018-177-181	RD 1/8T 180-J
TR18	31018-177-271	RD 1/8T 270-J
TR19	31018-177-271	RD 1/8T 270-J
TR20	31018-177-271	RD 1/8T 270-J
TR21	31018-177-101	RD 1/8T 100-J
TR22	31018-177-682	RD 1/8T 6.8K-J
TR23	31018-177-473	RD 1/8T 47K-J
	VARIABLE RESISTORS	
VR101	31249-128-008	EVN-DJA A03 B54
VR102	31249-128-005	EVN-DJA A03 B53
VR201	31249-128-001	EVN-DJA A03 B14
VR202	31249-128-001	EVN-DJA A03 B14
VR502	31249-128-004	EVN-DJA A03 B13
VR601	31249-128-005	EVN-DJA A03 B53
	CAPACITORS	
AG01	31607-803-730	CE04W TAPG 50V 4.7M-NP
C101	31407-105-660	CC45(T) CH 50V 101-J
C102	31417-104-280	CK45 TAPG B 50V 392-K
C103	31507-127-016	ECQ B1 H 472J F3
C104	31417-109-100	CK45 TAPG F 50V 102-Z
C105	31607-402-250	CE04W TAPG 50V 10M
C106	31417-109-140	CK45 TAPG F 50V 103-Z
C109	31607-401-480	CE04W TAPG 16V 220M-M
C110	31607-402-250	CE04W TAPG 50V 10M

Loc No	Supplier Parts No.	Specification
C112	31417-109-140	CK45 TAPG F 50V 103-Z
C113	31507-127-012	EVQB1 H 104J-F3
C114	31607-402-250	CE04W TAPG 50V 10M
C115	31607-401-480	CE04W TAPG 16V 220M-M
C116	31607-402-200	CE04W TAPG 50V 0.47M
C117	31417-109-140	CK45 TAPG F 50V 103-Z
C118	31417-109-140	CK45 TAPG F 50V 103-Z
C119	31417-109-140	CK45 TAPG F 50V 103-Z
C120	31607-402-250	CE04W TAPG 50V 10M
C121	31607-402-240	CE04W TAPG 50V 4.7M
C122	31607-402-250	CE04W TAPG 50V 10M
C123	31607-401-670	CE04W TAPG 25V 47M
C124	31507-127-025	EVQ-V1H 334J Z3
C125	31507-127-025	EVQ-V1H 334J Z3
C126	31607-402-240	CE04W TAPG 50V 4.7M
C127	31507-127-024	EVQ-V1H 224J Z3
C128	31407-106-250	CC45(T) SL 50V 331-J
C129	31607-401-480	CE04W TAPG 16V 220M-M
C130	31417-109-100	CK45 TAPG F 50V 102-Z
C201	31507-127-008	ECQ B1 H 223J F3
C202	31507-127-008	ECQ B1 H 223J F3
C203	31507-127-008	ECQ B1 H 223J F3
C204	31507-127-008	ECQ B1 H 223J F3
C205	31507-127-008	ECQ B1 H 223J F3
C206	31507-127-008	ECQ B1 H 223J F3
C207	31507-127-025	EVQ-V1H 334J Z3
C208	31507-127-025	EVQ-V1H 334J Z3
C210	31407-057-330	CC45(T) CH 50V 330-J
C211	31507-127-025	EVQ-V1H 334J Z3
C212	31607-402-250	CE04W TAPG 50V 10M
C214	31607-402-240	CE04W TAPG 50V 4.7M
C215	31607-402-240	CE04W TAPG 50V 4.7M
C216	31607-402-210	CE04W TAPG 50V 1M
C218	31607-401-480	CE04W TAPG 16V 220M-M
C220	31507-127-012	EVQB1 H 104J-F3
C227	31507-127-012	EVQB1 H 104J-F3
C252	31407-106-760	CC45(T) RH 50V 151-J
C253	31607-402-240	CE04W TAPG 50V 4.7M
C254	31407-106-230	CC45(T) RH 50V 300-J
C255	31417-104-270	CK45 TAPG B 50V 681-K
C256	31407-047-271	CC45(T) RH 50V 271-J
C257	31407-047-271	CC45(T) RH 50V 271-J
C258	31607-803-280	CE04W TAPG 50V 10-M(NP)
C259	31507-127-016	ECQ B1 H 472J F3
C260	31507-127-016	ECQ B1 H 472J F3
C261	31407-105-320	CC45(T) CH 50V 820-J
C262	31407-106-630	CC45(T) RH 50V 470-K
C501	31507-127-012	EVQB1 H 104J-F3
C503	31407-105-660	CC45(T) CH 50V 101-J
C504	31407-105-660	CC45(T) CH 50V 101-J
C505	31407-106-250	CC45(T) SL 50V 331-J
C506	31407-047-221	CC45(T) RH 50V 221-J
C507	31507-127-008	ECQ B1 H 223J F3
C508	31507-127-008	ECQ B1 H 223J F3
C509	31407-047-221	CC45(T) RH 50V 221-J
C510	31507-127-008	ECQ B1 H 223J F3

Loc No	Supplier Parts No.	Specification
C511	31407-101-160	CC45(T) SL 50V 150-J
C512	31407-101-270	CC45(T) SL 50V 470-J
C513	31407-106-760	CC45(T) RH 50V 151-J
C514	31407-047-390	CC45 TAPG RH 50V 390-J
C515	31507-127-012	EVQB1 H 104J-F3
C516	31507-127-025	EVQ-V1H 334J Z3
C517	31507-127-025	EVQ-V1H 334J Z3
C518	31507-127-010	ECQ B1H 473J F3
C519	31607-401-480	CE04W TAPG 16V 220M-M
C520	31507-127-006	ECQ B1 H 103J F3
C521	31507-127-008	ECQ B1 H 223J F3
C522	31507-127-008	ECQ B1 H 223J F3
C523	31407-047-221	CC45(T) RH 50V 221-J
C525	31507-127-012	EVQB1 H 104J-F3
C526	31507-127-012	EVQB1 H 104J-F3
C527	31407-106-200	CC45(T) RH 50V 270-J
C530	31407-047-221	CC45(T) RH 50V 221-J
C531	31407-106-200	CC45(T) RH 50V 270-J
C532	31507-127-008	ECQ B1 H 223J F3
C533	31507-127-006	ECQ B1 H 103J F3
C534	31607-401-480	CE04W TAPG 16V 220M-M
C535	31507-127-012	EVQB1 H 104J-F3
C536	31407-106-250	CC45(T) SL 50V 331-J
C537	31507-127-025	EVQ-V1H 334J Z3
C538	31507-127-025	EVQ-V1H 334J Z3
C539	31507-127-010	ECQ B1H 473J F3
C540	31507-127-012	EVQB1 H 104J-F3
C542	31507-127-012	EVQB1 H 104J-F3
C543	31407-047-221	CC45(T) RH 50V 221-J
C545	31829-105-610	TZ03P 450E
C546	31507-127-012	EVQB1 H 104J-F3
C547	31507-127-008	ECQ B1 H 223J F3
C601	31607-401-430	CE04W TAPG 25V 10M
C602	31607-402-240	CE04W TAPG 50V 4.7M
C603	31607-402-240	CE04W TAPG 50V 4.7M
C604	31417-109-140	CK45 TAPG F 50V 103-Z
C605	31607-402-220	CE04W TAPG 50V 2.2M
C606	31607-402-220	CE04W TAPG 50V 2.2M
C607	31607-402-220	CE04W TAPG 50V 2.2M
C608	31607-402-220	CE04W TAPG 50V 2.2M
C609	31407-106-230	CC45(T) RH 50V 300-J
C612	31607-401-480	CE04W TAPG 16V 220M-M
C613	31417-109-140	CK45 TAPG F 50V 103-Z
C614	31607-803-120	CE04W TAPG 16V 10u-NP
C615	31607-803-120	CE04W TAPG 16V 10u-NP
C617	31507-127-012	EVQB1 H 104J-F3
C618	31507-127-012	EVQB1 H 104J-F3
C619	31607-803-730	CE04W TAPG 50V 4.7M-NP
C620	31607-803-730	CE04W TAPG 50V 4.7M-NP
C623	31607-803-730	CE04W TAPG 50V 4.7M-NP
C624	31607-803-730	CE04W TAPG 50V 4.7M-NP
C625	31607-803-730	CE04W TAPG 50V 4.7M-NP
C627	31607-803-730	CE04W TAPG 50V 4.7M-NP
C630	31417-109-140	CK45 TAPG F 50V 103-Z
C631	31507-127-010	ECQ B1H 473J F3
C632	31507-127-004	ECQ B1 H 562J F3
C633	31607-402-240	CE04W TAPG 50V 4.7M

Loc No	Supplier Parts No.	Specification
C634	31607-401-470	CE04W TAPG 16V 100M VENT
C635	31607-803-730	CE04W TAPG 50V 4.7M-NP
C636	31607-803-730	CE04W TAPG 50V 4.7M-NP
C637	31607-803-730	CE04W TAPG 50V 4.7M-NP
C638	31607-803-730	CE04W TAPG 50V 4.7M-NP
C639	31607-803-730	CE04W TAPG 50V 4.7M-NP
C640	31607-401-480	CE04W TAPG 16V 220M-M
C642	31607-803-730	CE04W TAPG 50V 4.7M-NP
C643	31507-127-007	ECQ B1 H 153J F3
C644	31507-127-007	ECQ B1 H 153J F3
C645	31507-127-010	ECQ B1H 473J F3
C646	31507-127-004	ECQ B1 H 562J F3
C647	31607-402-240	CE04W TAPG 50V 4.7M
C648	31607-803-730	CE04W TAPG 50V 4.7M-NP
C649	31607-803-730	CE04W TAPG 50V 4.7M-NP
C650	31417-109-140	CK45 TAPG F 50V 103-Z
C651	31417-109-140	CK45 TAPG F 50V 103-Z
C653	31607-401-480	CE04W TAPG 16V 220M-M
C654	31507-137-013	ECQ-B 1 103J F3
C655	31507-127-006	ECQ B1 H 103J F3
C656	31417-109-140	CK45 TAPG F 50V 103-Z
C657	31417-109-140	CK45 TAPG F 50V 103-Z
C658	31507-127-000	ECQ B1 H 102J F3
C659	31507-127-000	ECQ B1 H 102J F3
C660	31417-109-140	CK45 TAPG F 50V 103-Z
C801	31607-401-720	CE04W TAPG 25V 1000M-M
C802	31607-401-770	CE04W TAPG 25V 2200M-M
C803	31607-401-720	CE04W TAPG 25V 1000M-M
C804	31607-401-500	CE04W TAPG 16V 470M-M
C805	31607-401-770	CE04W TAPG 25V 2200M-M
CX01	31497-009-440	EXF-FP5 331MDV(6P 331)
CX02	31497-009-360	EXF-FP8 331MDV(9P 331)
CX03	31497-009-340	EXF-FP4 331MDV(5P 331)
PC01	31607-803-280	CE04W TAPG 50V 1U-M(NP)
RC01	31507-127-000	ECQ B1 H 102J F3
RC02	31507-127-000	ECQ B1 H 102J F3
RC03	31417-109-140	CK45 TAPG F 50V 103-Z
RC04	31507-127-025	EVQ-V1H 334J Z3
RC06	31407-106-250	CC45(T) SL 50V 331-J
RC08	31407-106-250	CC45(T) SL 50V 331-J
RC09	31607-402-250	CE04W TAPG 50V 10M
RC10	31607-402-250	CE04W TAPG 50V 10M
RC11	31607-402-250	CE04W TAPG 50V 10M
RC14	31607-402-210	CE04W TAPG 50V 1M
RC15	31407-105-180	CC45(T) CH 50V 220-J
RC18	31607-401-450	CE04W TAPG 16V 33M
RC19	31607-401-480	CE04W TAPG 16V 220M-M
RC20	31417-109-140	CK45 TAPG F 50V 103-Z
RC22	31407-105-180	CC45(T) CH 50V 220-J
RC24	31417-109-140	CK45 TAPG F 50V 103-Z
RC25	31607-401-460	CE04W TAPG 16V 47M
RC26	31417-109-140	CK45 TAPG F 50V 103-Z
SC01	31417-109-140	CK45 TAPG F 50V 103-Z
SC02	31407-106-760	CC45(T) RH 50V 151-J
SC03	31607-803-730	CE04W TAPG 50V 4.7M-NP
TC01	31417-109-140	CK45 TAPG F 50V 103-Z
TC02	31417-109-140	CK45 TAPG F 50V 103-Z

Loc No	Supplier Parts No.	Specification
TC03	31607-402-070	CE04W TAPG 35V 22M
TC04	31407-105-180	CC45(T) CH 50V 220-J
TC05	31407-105-180	CC45(T) CH 50V 220-J
TC07	31507-127-012	EVQB1 H 104J-F3
TC08	31417-109-100	CK45 TAPG F 50V 102-Z
TC09	31407-105-180	CC45(T) CH 50V 220-J
TC10	31607-401-500	CE04W TAPG 16V 470M-M
TC11	31507-127-012	EVQB1 H 104J-F3
TC12	31507-127-012	EVQB1 H 104J-F3
TC13	31507-127-012	EVQB1 H 104J-F3
TC14	31507-127-012	EVQB1 H 104J-F3
TC15	31407-105-180	CC45(T) CH 50V 220-J
TC17	31607-402-290	CE04W TAPG 50V 100M-M
X502	31407-105-180	CC45(T) CH 50V 220-J
	I C	
IC101	32119-101-840	TDA2549/C4
IC201	32119-501-020	TDA3505 V9/V1
IC501	32119-110-040	TDA4650V3/V4
IC502	32119-110-006	TDA4660/V2
IC503	32119-101-650	TDA4565/V6
IC504	32109-301-890	CD4053BCN/MM5653BN
IC505	32109-301-900	CD4066BCN/MM5666BN
IC601	32119-110-065	TDA3866
IC602	32119-710-012	TDA8415/V2
IC603	32109-410-260	TC4052BP
IC604	32119-710-011	TDA8425/V7
RIC01	32109-110-047	SPM113-1(PCA84C641P/010)
RIC02	32109-210-023	X24C02P
RIC03	32109-210-023	X24C02P
RIC04	32119-201-270	LA7910
TIC01	32109-110-043	PCB83C654P013
TIC02	32109-110-017	SAA5246P/E,M2
TIC03	32109-201-410	KM6264AP-10
TIC04	32109-310-080	PC74HCT241P
	TRANSISTORS	
Q101	32137-301-090	2SC388ATM(TAPG)
Q103	32137-301-720	KSC 815-Y(TAPG)
Q203	32137-401-530	KSA 539-Y(TAPG)
Q251	32137-301-720	KSC 815-Y(TAPG)
Q252	32137-301-720	KSC 815-Y(TAPG)
Q253	32137-301-720	KSC 815-Y(TAPG)
Q501	32157-210-000	BC548-C(TAPG)
Q502	32157-210-001	BC558-C(TAPG)
Q503	32157-210-000	BC548-C(TAPG)
Q504	32157-210-000	BC548-C(TAPG)
Q505	32137-301-720	KSC 815-Y(TAPG)
Q506	32137-301-720	KSC 815-Y(TAPG)
Q701	32137-301-720	KSC 815-Y(TAPG)
RQ01	32137-301-720	KSC 815-Y(TAPG)
RQ02	32137-301-720	KSC 815-Y(TAPG)
RQ03	32137-301-720	KSC 815-Y(TAPG)
RQ04	32137-301-720	KSC 815-Y(TAPG)
RQ05	32137-301-720	KSC 815-Y(TAPG)
RQ06	32137-301-720	KSC 815-Y(TAPG)
RQ07	32137-301-720	KSC 815-Y(TAPG)
RQ08	32137-301-720	KSC 815-Y(TAPG)
RQ09	32137-301-720	KSC 815-Y(TAPG)
RQ10	32137-301-720	KSC 815-Y(TAPG)
SQ01	32137-301-720	KSC 815-Y(TAPG)
	DIODES	
D121	32167-406-480	1N4148 TAPG
D204	32167-406-480	1N4148 TAPG
D205	32167-406-480	1N4148 TAPG
D502	32167-406-480	1N4148 TAPG
D503	32167-406-480	1N4148 TAPG
D506	32167-406-480	1N4148 TAPG
D601	32167-406-480	1N4148 TAPG
D602	32167-406-480	1N4148 TAPG
D603	32167-406-480	1N4148 TAPG
D604	32167-406-480	1N4148 TAPG
D801	32167-201-070	1N4003 TAPG
D802	32167-201-070	1N4003 TAPG
DT08	32167-406-480	1N4148 TAPG
DZ201	32167-401-630	EQA02-12A
DZ202	32167-401-630	EQA02-12A
DZ203	32167-401-630	EQA02-12A
DZ502	32167-401-800	EQA02-06A/MTZ5.6B(TAPG)
DZ503	32167-406-070	MTZ 5.1A
DZ601	32167-401-800	EQA02-06A/MTZ5.6B(TAPG)
PD01	32167-406-480	1N4148 TAPG
PD02	32167-406-480	1N4148 TAPG
RD01	32167-406-480	1N4148 TAPG
RD04	32167-406-480	1N4148 TAPG
RD05	32167-406-480	1N4148 TAPG
RD06	32167-406-480	1N4148 TAPG
RD08	32167-406-480	1N4148 TAPG
RD09	32167-406-480	1N4148 TAPG
RD10	32167-406-480	1N4148 TAPG
RD11	32167-406-480	1N4148 TAPG
RD14	32167-201-070	1N4003 TAPG
RD15	32167-406-480	1N4148 TAPG
RD16	32167-406-480	1N4148 TAPG
RD50	32167-406-480	1N4148 TAPG
RD51	32167-406-480	1N4148 TAPG
RDZ01	32167-406-070	MTZ 5.1A
RDZ02	32167-406-070	MTZ 5.1A
RDZ04	32167-406-070	MTZ 5.1A
RDZ05	32167-401-800	EQA02-06A/MTZ5.6B(TAPG)
TD05	32167-406-480	1N4148 TAPG
TD06	32167-406-480	1N4148 TAPG
	MODILE REMOCON	
**PR01	32196-411-002	SR-5GP(R)
	LED	
**CD01	32309-110-230	DS2 (DL-ILR)/SL-5R
**CD02	32309-110-230	DS2 (DL-ILR)/SL-5R
**CD03	32309-110-230	DS2 (DL-ILR)/SL-5R
**CD04	32309-110-230	DS2 (DL-ILR)/SL-5R
	COILS	

Loc No	Supplier Parts No.	Specification
D-COIL	32479-029-250	25R T91 L3120
L101	32429-904-580	1.5UH-K
L102	32427-805-330	5.6UH-M
L254	32427-803-410	8.2UH-M
L502	32427-805-330	5.6UH-M
L503	32427-803-410	8.2UH-M
RL01	32427-803-130	10UH-K TAPG
SL01	32427-904-750	4.7UH-K TAPG
TL14	32427-904-750	4.7UH-K TAPG
		TRANS
L251	32709-024-260	4MHZ
L252	32709-024-350	72UH
L253	32769-110-710	113CN-K5037BY
L501	32709-024-300	4.33 MHZ(7CAN)
T101	32717-513-800	38.9MHZ(S-60)
T102	32717-513-800	38.9MHZ(S-60)
T601	32709-024-240	35MHZ
T602	32727-601-009	5.5MHZ(7M/M)
T603	32727-601-009	5.5MHZ(7M/M)
		TUNER
**TUN01	34519-600-017	TECC-2989VA15A
		FILTERS
Z101	34529-700-005	OFW G 3963 M
Z102	34527-460-004	TPS5.5MB TF21
Z602	34529-700-006	OFW K 9253 M
Z603	34529-439-910	SFE 5.74MC
Z604	34527-460-003	SFE5.5MB TF21
Z605	34529-439-910	SFE 5.74MC
		CRYSTALS
RX01	34539-001-000	10MHZ
TX01	34539-071-050	HC-18/U,12MHZ
TX03	34539-001-018	27MHZ
X501	34537-001-020	8.867238MHZ(TAPG)
X601	34539-001-000	10MHZ
		MISCELLANEOUS
AJ01	33339-130-002	5P Y,W,R
CN601	33347-114-820	YW025-04(AUTO,NO TUBE)
CN601	33050-101-895	Y4XY4/1185X2/100
CN801	33345-110-310	67094-012(SEP)
CN901	33058-023-008	S12XS12/F/200
CNA07	33347-108-310	67094-003(AUTO)
CNA08	33347-108-140	67094-006 (AUTO)
CNC02	33347-108-140	67094-006 (AUTO)
CNC03	33347-108-310	67094-003(AUTO)
CNC04	33347-108-310	67094-003(AUTO)
CNC05	33347-108-310	67094-003(AUTO)
CNC07	33347-108-310	67094-003(AUTO)
J701	33136-103-030	HXC-1510-01-300A(R)
SJ01	33329-100-150	TCS7549-01-201
SW01	33609-101-011	KPT-1112/JTM-1109F
SW02	33598-001-006	JTR-1102(18P4B)
SW03	33598-001-006	JTR-1102(18P4B)

Loc No	Supplier Parts No.	Specification
SW04	33598-001-006	JTR-1102(18P4B)
		ASSY-H/S TR
	*3H84-00020-000	35684-118-330,MC7812C
I C	32119-901-110	MC7812C (AUTO)
H/SINK	35684-118-330	A6063 EXTR BLK H30
SCREW	37158-230-061	2S-3X6 FE FZY
		A S S Y - P W B C R T
	*3D32-00010-160	CX6229T
PWB	33004-145-581	P88MS(T),<S.N.A>
		RESISTORS
R506	31018-277-152	RD 1/4T 1.5K-J
R550	31018-277-102	RD 1/4T 1K-J
R551	31018-277-122	RD 1/4T 1.2K-J
R553	31017-347-681	RD 1/2N 680-J (F.P)
R555	31018-377-684	RD 1/2T 680K-J
R556	31018-277-102	RD 1/4T 1K-J
**R557	31028-328-472	RC 1/2T 4.7K-K
R558	31018-277-680	RD 1/4T 68-J
R559	31018-277-102	RD 1/4T 1K-J
R560	31018-277-122	RD 1/4T 1.2K-J
**R561	31049-101-473	RS 1P 47K-J
R562	31017-347-681	RD 1/2N 680-J (F.P)
R563	31018-277-122	RD 1/4T 1.2K-J
R564	31018-377-684	RD 1/2T 680K-J
**R565	31049-315-030	RS 2P 18K-J
**R566	31028-328-472	RC 1/2T 4.7K-K
R568	31018-277-122	RD 1/4T 1.2K-J
**R569	31049-101-473	RS 1P 47K-J
R570	31017-347-681	RD 1/2N 680-J (F.P)
R571	31018-277-122	RD 1/4T 1.2K-J
R572	31018-377-684	RD 1/2T 680K-J
**R573	31049-315-030	RS 2P 18K-J
**R574	31028-328-472	RC 1/2T 4.7K-K
R575	31018-277-561	RD 1/4T 560-J
R578	31018-277-122	RD 1/4T 1.2K-J
**R580	31059-004-040	RF 2P 2.4-J
**R581	31049-315-030	RS 2P 18K-J
**R582	31049-101-473	RS 1P 47K-J
R590	31018-377-105	RD 1/2T 1M-J
VR550	31018-277-680	RD 1/4T 68-J
VR551	31018-277-680	RD 1/4T 68-J
		CAPACITORS
C551	31417-104-250	CK45 TAPG B 50V 471-K
C552	31417-104-050	CK45 TAPG B 50V 101-K
C553	31407-105-700	CC45(T) CH 50V 151-J
C554	31407-105-300	CC45(T) CH 50V 680-J
C555	31417-104-250	CK45 TAPG B 50V 471-K
C556	31407-101-360	CC45(T) SL 50V 101-J
C557	31407-105-700	CC45(T) CH 50V 151-J
C558	31417-104-250	CK45 TAPG B 50V 471-K

Loc No	Supplier Parts No.	Specification
C559	31607-402-480	CE04W TAPG 50V 47-W
C560	31609-403-460	CE04W 250V 2.2-VENT
C561	31417-767-331	CK45(T) B2KV 331-K
C566	31407-105-700	CC45(T) CH 50V 151-J
C567	31607-401-460	CE04W TAPG 16V 47M
C590	31609-403-460	CE04W 250V 2.2-VENT
	TRANSISTORS	
Q550	32159-101-270	BF 871
Q551	32137-301-510	KSC 2310-O(TAPG)
Q552	32159-101-260	BF 423
Q553	32159-101-270	BF 871
Q554	32137-301-510	KSC 2310-O(TAPG)
Q555	32159-101-260	BF 423
Q556	32159-101-270	BF 871
Q557	32137-301-510	KSC 2310-O(TAPG)
Q558	32159-101-260	BF 423
Q559	32137-401-530	KSA 539-Y(TAPG)
	DIODES	
D550	32167-406-480	1N4148 TAPG
D551	32167-406-480	1N4148 TAPG
D552	32167-201-070	1N4003 TAPG
D553	32167-406-480	1N4148 TAPG
D554	32167-406-480	1N4148 TAPG
D555	32167-201-070	1N4003 TAPG
D556	32167-406-480	1N4148 TAPG
D557	32167-406-480	1N4148 TAPG
D558	32167-201-070	1N4003 TAPG
D590	32167-201-180	M100J(TAPG)
	CRT-SOCKET	
**V999A	33359-063-620	HF-29.1A
	MISCELLANEOUS	
CNT08	33058-017-020	S6XS6/F/500
CNT08	33345-108-140	67094-006(SEP)
CNT09	33347-114-820	YW025-04(AUTO,NO TUBE)
CNT09	33050-101-851	Y4XY4/1185X2/500
	A S S Y - P W B C O N T R O L	
	*3D33-00593-470	CX6226Z,WT
PWB	33004-146-221	CX6226Z <S.N.A>
CC01	31607-401-460	CE04W TAPG 16V 47M
CD01	32309-110-230	DS2 (DL-ILR)/SL-5R
CD02	32309-110-230	DS2 (DL-ILR)/SL-5R
CD03	32309-110-230	DS2 (DL-ILR)/SL-5R
CD05	32309-110-230	DS2 (DL-ILR)/SL-5R
CNC03	33055-216-215	S3/2405/700
CNC04	33058-003-028	S3(2)/F/700
CNC05	33058-002-028	S3/F/700
CR01	31018-277-223	RD 1/4T 22K-J
CR02	31018-277-220	RD 1/4T 22-J
CR03	31018-277-681	RD 1/4T 680-J
PA01	32199-411-011	SR-3CD

Loc No	Supplier Parts No.	Specification
	A S S Y - C O N T R O L , C O N N E C T O R	
	*3D33-00593-480	CX6226Z
PWB	33004-146-241	CX6226Z <S.N.A>
BRKT/D	36613-165-610	SBHG-1 T1.0 CT-2596
COVER	36153-101-510	HIPS HB BLK CT-2596
PVC/D	38094-102-760	PVC SHEET T0.3 BLK NO
SCREW	37148-540-101	2S-4X10 FE FZY
CNC02	33347-108-140	67094-006 (AUTO)
CNC02	33058-017-024	S6XS6/F/600
CNC06	33124-300-012	52030-1210,10P
SCREW	37148-540-101	2S-4X10 FE FZY
	A S S Y - P W B , S P K J A C K	
	*3D39-00004-050	4P CX6226W
PWB	33004-650-110	CX6230W <S.N.A>
CNT602	33050-005-012	Y4/F/300
JAT01	33304-114-320	PUSH-4P(PCB)
AJ01	33339-130-002	5P Y,W,R
CNT601	33347-114-810	YW025-04(AUTO)
SWT01	33519-106-008	KSA-2273
BRKT/J	36613-164-611	SBHG-1 100 T1.0
SCREW	37148-530-081	2S-3X8 FE FZY
SCREW	37148-530-081	2S-3X8 FE FZY
SCREW	37148-540-101	2S-4X10 FE FZY
	A S S Y - P W B , A / V	
	*3D39-00004-070	CX7226W/AMFX
PWB	33004-146-231	CX6226Z <S.N.A>
CNC09A	33058-101-685	S5XS5/1185X2405/500
CNC07A	33058-102-321	S6XS6/2405X2/500
SOCKET	33329-100-151	TCS7942-01-201
AV001	33339-030-310	2P,S,R,W(A)
POST/H	33347-108-140	67094-006 (AUTO)
POST/H	33347-108-180	67094-005 (AUTO)
	A S S Y - P W B P O W E R	
	*3D50-00002-250	CX7226W/AMFX
PCB	33004-253-071	330X197X1.6T <S.N.A>
	RESISTORS	
R302	31018-377-331	RD 1/2T 330-J
R303	31018-277-432	RD 1/4T 4.3K-J
**R305	31049-275-433	RM 1/4T 43K-F
R306	31018-277-473	RD 1/4T 47K-J
R307	31018-277-102	RD 1/4T 1K-J
R308	31018-277-302	RD 1/4T 3K-J
R309	31018-377-129	RD 1/2T 1.2-J
R310	31018-277-820	RD 1/4T 82-J
R311	31018-377-154	RD 1/2T 150K-J
R312	31018-277-221	RD 1/4T 220-J
R313	31018-277-562	RD 1/4T 5.6K-J

Loc No	Supplier Parts No.	Specification
R314	31018-277-220	RD 1/4T 22-J
R315	31018-277-152	RD 1/4T 1.5K-J
R316	31018-277-391	RD 1/4T 390-J
R317	31018-277-432	RD 1/4T 4.3K-J
R318	31018-277-432	RD 1/4T 4.3K-J
R319	31018-277-432	RD 1/4T 4.3K-J
R320	31018-377-688	RD 1/2T 0.68-J
R321	31018-277-102	RD 1/4T 1K-J
R322	31018-277-472	RD 1/4T 4.7K-J
**R323	31046-567-221	RS 2T 220-J(AUTO)
R324	31018-277-103	RD 1/4T 10K-J
R325	31018-277-152	RD 1/4T 1.5K-J
R326	31018-277-682	RD 1/4T 6.8K-J
**R327	31046-467-101	RS 1T 100-J(AUTO)
R350	31018-377-471	RD 1/2T 470-J
**R400	31059-427-121	RF 1P 120-J
R401	31018-277-221	RD 1/4T 220-J
**R402	31046-467-470	RS 1T 47-J (AUTO)
R404	31018-277-222	RD 1/4T 2.2K-J
R405	31018-277-203	RD 1/4T 20K-J
**R406	31059-002-130	RF 1/2P 0.47-K
R407	31018-277-333	RD 1/4T 33K-J
R408	31018-277-203	RD 1/4T 20K-J
**R411	31049-375-114	RM 1/2T 110K-F
R412	31018-377-102	RD 1/2T 1K-J
**R413	31039-687-569	RW 7H 5.6-J
**R414	31059-002-130	RF 1/2P 0.47-K
**R415	31059-002-130	RF 1/2P 0.47-K
R416	31018-377-220	RD 1/2T 22-J
**R417	31048-277-478	RM 1/4T 0.47-J
**R418	31046-467-122	RS 1T 1.2K-J (AUTO)
R420	31018-277-333	RD 1/4T 33K-J
R421	31018-277-393	RD 1/4T 39K-J
**R423	31046-467-102	RS 1T 1K-J (AUTO)
R424	31018-277-432	RD 1/4T 4.3K-J
R425	31018-277-222	RD 1/4T 2.2K-J
R426	31018-277-181	RD 1/4T 180-J
**R657	31039-687-109	RW 7H 1-J
R658	31018-277-221	RD 1/4T 220-J
R659	31018-277-221	RD 1/4T 220-J
R661	31018-377-399	RD 1/2T 3.9-J
R662	31018-377-399	RD 1/2T 3.9-J
**R801	31039-787-479	RW 10H 4.7-J
**R802	31046-468-688	RS 1T 0.68-K (AUTO)
**R804	31046-567-913	RS 2T 91K-J(AUTO)
R805	31018-277-153	RD 1/4T 15K-J
R806	31018-377-104	RD 1/2T 100K-J
R807	31018-377-154	RD 1/2T 150K-J
R808	31018-377-124	RD 1/2T 120K-J
R809	31018-277-122	RD 1/4T 1.2K-J
R810	31018-277-103	RD 1/4T 10K-J
R811	31018-277-221	RD 1/4T 220-J
R812	31018-377-154	RD 1/2T 150K-J
**R813	31046-567-132	RS 2T 1.3K-J(AUTO)
**R814	31046-567-132	RS 2T 1.3K-J(AUTO)
**R815	31028-328-475	RC 1/2T 4.7M-K
**R816	31059-002-130	RF 1/2P 0.47-K

Loc No	Supplier Parts No.	Specification
**R817	31059-004-010	RF 2P 0.47-K
**R818	31046-567-243	RS 2T 24K-J(AUTO)
R820	31018-377-124	RD 1/2T 120K-J
**R821	31046-567-104	RS 2T 100K-J
R822	31018-377-270	RD 1/2T 27-J
**R823	31059-002-130	RF 1/2P 0.47-K
**R824	31046-567-913	RS 2T 91K-J(AUTO)
**R825	31046-567-680	RS 2T 68-J(AUTO)
**R826	31028-378-335	RC 1/2T 3.3M-K
**R827	31046-467-470	RS 1T 47-J (AUTO)
R828	31018-377-102	RD 1/2T 1K-J
R829	31018-377-101	RD 1/2T 100-J
R830	31018-377-101	RD 1/2T 100-J
R831	31018-377-101	RD 1/2T 100-J
R832	31018-377-101	RD 1/2T 100-J
**R833	31028-328-475	RC 1/2T 4.7M-K
**R834	31046-468-688	RS 1T 0.68-K (AUTO)
**R835	31046-467-470	RS 1T 47-J (AUTO)
**R836	31046-468-688	RS 1T 0.68-K (AUTO)
SR01	31018-277-913	RD 1/4T 91K-J
SR02	31018-277-682	RD 1/4T 6.8K-J
SR03	31018-277-133	RD 1/4T 13K-J
SR04	31018-277-913	RD 1/4T 91K-J
SR05	31018-277-822	RD 1/4T 8.2K-J
SR06	31018-277-681	RD 1/4T 680-J
SR08	31018-277-132	RD 1/4T 1.3K-J
SR09	31018-277-512	RD 1/4T 5.1K-J
SR10	31018-277-242	RD 1/4T 2.4K-J
SR11	31018-277-152	RD 1/4T 1.5K-J
SR12	31018-277-432	RD 1/4T 4.3K-J
**SR14	31046-477-271	RS 1T 270-J
		VARIABLE RESISTORS
SVR01	31249-128-005	EVN-DJA A03 B53
SVR02	31249-130-006	EVN-DCA A03 B24
SVR03	31249-128-004	EVN-DJA A03 B13
VR301	31249-128-010	EVN-DJA A03 B15
VR401	31249-128-005	EVN-DJA A03 B53
VR402	31249-128-008	EVN-DJA A03 B54
VR801	31249-128-005	EVN-DJA A03 B53
		CAPACITORS
C301	31607-402-100	CE04W TAPG 35V 100M-M
C302	31507-127-006	ECQ B1 H 103J F3
C303	31507-127-006	ECQ B1 H 103J F3
C305	31507-127-012	EVQB1 H 104J-F3
C306	31507-127-001	ECQ B1 H 152J F3
C307	31607-402-240	CE04W TAPG 50V 4.7M
C308	31607-402-130	CE04W TAPG 35V 470M-M
C309	31417-109-140	CK45 TAPG F 50V 103-Z
C310	31507-127-004	ECQ B1 H 562J F3
**C311	31519-101-110	DSR 50V 0.22U-J
C312	31407-106-760	CC45(T) RH 50V 151-J
C313	31607-402-220	CE04W TAPG 50V 2.2M
C314	31607-402-070	CE04W TAPG 35V 22M
C315	31507-127-012	EVQB1 H 104J-F3
C316	31607-402-250	CE04W TAPG 50V 10M

Loc No	Supplier Parts No.	Specification
C401	31417-104-250	CK45 TAPG B 50V 471-K
C403	31507-127-007	ECQ B1 H 153J F3
**C406	31519-400-001	CFS 922M 1600V 0.0063-J
**C407	31509-337-090	CQ922M 400V 0.022-J
C409	31607-401-770	CE04W TAPG 25V 2200M-M
C410	31609-403-120	CE04W 100V 220M-VENT
**C411	31519-390-002	CFS922M 200V 434-J
C412	31607-402-130	CE04W TAPG 35V 470M-M
**C413	31519-003-020	CFS922M 400V 0.1-K
C414	31609-803-930	CE04W 250V 2.2M
**C415	31519-383-684	CFS 922M 250V 684-J
C416	31609-403-460	CE04W 250V 2.2-VENT
**C418	31509-335-520	CQ922M 200V 0.1-J
**C419	31518-333-514	CFS 922M 200V 0.51U-J
C421	31607-401-500	CE04W TAPG 16V 470M-M
C423	31507-127-012	EVQB1 H 104J-F3
**C424	31519-101-100	DSR 50V 0.0027 U-J
C425	31607-401-460	CE04W TAPG 16V 47M
C426	31507-127-010	ECQ B1H 473J F3
C434	31417-109-140	CK45 TAPG F 50V 103-Z
**C435	31519-400-006	CFS 922M 1600V 0.0039-J
C608	31609-402-490	CE04W 35V 2200M
C651	31507-127-009	ECQ B1 H 333J F3
C652	31607-401-460	CE04W TAPG 16V 47M
C653	31607-401-460	CE04W TAPG 16V 47M
C654	31607-401-670	CE04W TAPG 25V 47M
C655	31607-401-460	CE04W TAPG 16V 47M
C656	31507-127-009	ECQ B1 H 333J F3
C657	31609-402-490	CE04W 35V 2200M
C660	31607-401-770	CE04W TAPG 25V 2200M-M
C661	31607-401-770	CE04W TAPG 25V 2200M-M
C801	31467-502-220	CK45P TAPG E250V 222-Z
C802	31467-502-220	CK45P TAPG E250V 222-Z
C803	31467-502-220	CK45P TAPG E250V 222-Z
C804	31467-502-220	CK45P TAPG E250V 222-Z
C805	31417-109-140	CK45 TAPG F 50V 103-Z
C806	31607-401-680	CE04W TAPG 25V 100U
C807	31609-403-840	CE04W 400V 220M(30X40)
C808	31607-401-680	CE04W TAPG 25V 100U
**C810	31509-337-770	CQ922M 400V 0.0082-J
C811	31607-402-210	CE04W TAPG 50V 1M
C812	31607-401-470	CE04W TAPG 16V 100M VENT
**C814	31509-391-050	CQ922M 1600V 0.01M-J
C816	31407-105-700	CC45(T) CH 50V 151-J
C817	31469-504-060	ECR-DNS472MEX/E400V 472
C818	31469-504-060	ECR-DNS472MEX/E400V 472
C821	31607-401-510	CE04W TAPG 16V 1000U-M
C822	31417-901-180	CK45(T) B2KV 271-K
C824	31417-618-851	CK45(T) B1KV 851-K
C825	31417-901-180	CK45(T) B2KV 271-K
C826	31417-767-331	CK45(T) B2KV 331-K
C827	31417-109-140	CK45 TAPG F 50V 103-Z
C828	31607-402-250	CE04W TAPG 50V 10M
C829	31417-901-180	CK45(T) B2KV 271-K
C830	31607-401-510	CE04W TAPG 16V 1000U-M
C831	31609-403-910	CE04W 200V 220M(30X25)
**C834	31569-513-683	XE104.250V 0.1UF

Loc No	Supplier Parts No.	Specification
C836	31417-109-140	CK45 TAPG F 50V 103-Z
**C841	31569-204-190	250V 0.47M/KNB 1530
**C842	31569-204-190	250V 0.47M/KNB 1530
**C843	31569-204-190	250V 0.47M/KNB 1530
C844	31507-127-004	ECQ B1 H 562J F3
SC01	31507-127-024	EVQ-V1H 224J Z3
**SC02	31517-001-001	36515154/3E 63V 154K
SC03	31607-403-200	CE04W TAPG 160V 4.7M-M
SC04	31607-402-480	CE04W TAPG 50V 47-W
SC05	31607-402-480	CE04W TAPG 50V 47-W
SC06	31607-402-100	CE04W TAPG 35V 100M-M
		I C
**IC804	32117-901-110	MC7812C (AUTO)
**IC401	32119-101-460	TDA2579A/N8
**D810	32119-103-060	UPC574J
		TRANSISTORS
Q301	32137-301-720	KSC 815-Y(TAPG)
Q302	32137-301-720	KSC 815-Y(TAPG)
**Q402	32147-301-020	KSC 2073 (AUTO)
SQ01	32137-301-720	KSC 815-Y(TAPG)
SQ02	32137-103-430	KSA 642-O(TAPG)
		DIODES
D301	32167-208-550	ERC24-06
D401	32167-207-120	1R5GU41(TAPG)
D402	32167-201-190	RGP15G(TAPG)
D403	32167-207-120	1R5GU41(TAPG)
D404	32167-501-030	BYW96D/BYT77
D405	32169-101-210	BY228/(TFK)
D406	32167-201-070	1N4003 TAPG
D407	32167-201-070	1N4003 TAPG
D408	32167-201-070	1N4003 TAPG
D409	32167-201-070	1N4003 TAPG
D601	32167-406-480	1N4148 TAPG
D801	32167-208-550	ERC24-06
D802	32167-208-550	ERC24-06
D803	32167-208-550	ERC24-06
D804	32167-208-550	ERC24-06
D805	32167-201-110	KF104
D807	32167-208-550	ERC24-06
D809	32167-208-550	ERC24-06
D811	32167-208-550	ERC24-06
D812	32167-501-040	GI824
D813	32167-406-180	MTZ 16C
D814	32169-201-230	RU4AM
D825	32167-208-550	ERC24-06
D826	32167-201-070	1N4003 TAPG
D830	32169-301-670	RH-2F
D831	32167-201-070	1N4003 TAPG
DZ601	32167-406-130	MTZ 9.1B
PJ43	32167-201-070	1N4003 TAPG
SDZ01	32167-408-070	EQA02-23AC TAPG
		THERMISTOR
**P802	32189-102-030	P2462-J29/J29-P190-A20

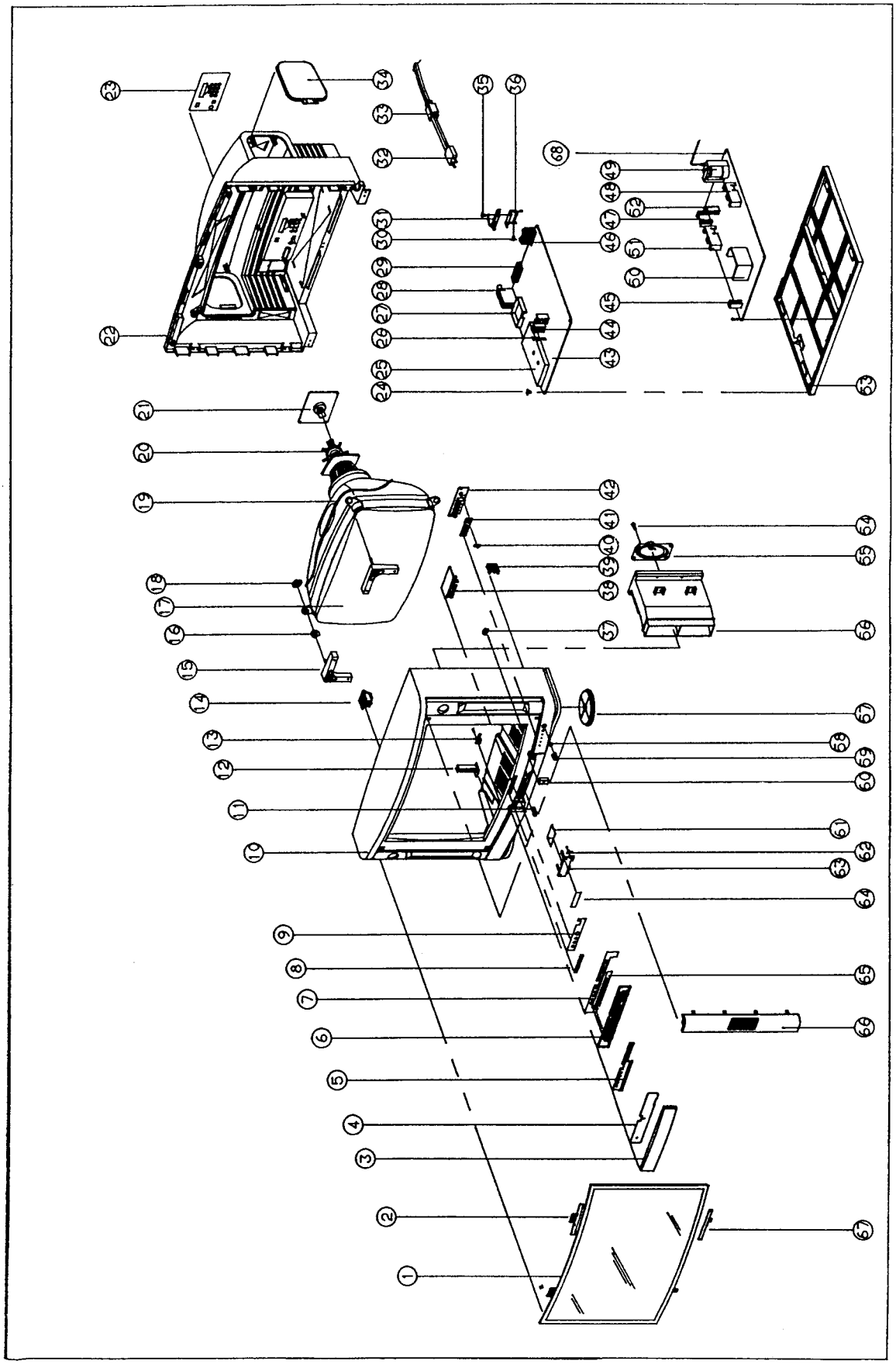
Loc No	Supplier Parts No.	Specification
		POSISTOR
**P801	32189-609-330	PTH451C202BG360N270
		COILS
L401	32427-803-130	10UH-K TAPG
L402	32449-412-670	3MH-K
L404	32429-039-190	2.2MH
L405	32449-730-001	22UH/2PIN
L406	32449-412-560	26UH-K(K-58)
L408	32429-040-001	5.6MH
L801	32429-633-090	39MHX2(U)
L803	32429-226-160	4.7UH-K
SL01	32429-040-009	8.4MH(0.23mm)
		TRANS
**T401	32849-020-010	50MH,K-16
**T801	32899-002-431	P:160-260 S:155/23/16/5V
		TRANS FLYBACK
**T444	32859-200-013	FCR-25A005
		FUSE
**F801	34709-084-730	FST 250V 3.15A 20MM
		RELAY
**RL801	34729-002-010	JC 2A DC 12V
		MISCELLANEOUS
CN804	33124-111-100	1P AUTO
CNP01	33345-110-310	67094-012(SEP)
CNP02	33347-114-810	YW025-04(AUTO)
CNP09	33347-114-810	YW025-04(AUTO)
CNP601	33347-114-810	YW025-04(AUTO)
F801	33167-001-001	PFC 5000-0202
L403	34047-019-060	3.5X6X1.0
L804	34047-019-060	3.5X6X1.0
L805	34047-019-060	3.5X6X1.0
TP05	33054-833-008	P1/1015/400/GRN
		ASSY-H/S MAIN
	*3H80-00270-003	35684-118-810,2SD1887
**Q401	32159-210-032	2SD1887YD
H/SINK	35684-118-810	A1063 EXTR WHT
SCREW	37158-230-101	2S-3X10 FE FZY
WASHE	37334-105-910	SPG-1 T1.0 FZY-1
		ASSY-H/S SOUND
	*3H81-00160-000	35682-112-020,TA8200AH
IC602	32119-201-190	TA8200AH
H/SINK	35682-112-020	A6063 EXTR WHT
SCREW	37158-230-101	2S-3X10 FE FZY
		ASSY-H/S VERT(POWER)
	*3H82-00080-000	35684-113-710,TDA4601

Loc No	Supplier Parts No.	Specification
**IC801	32119-401-010	TDA4601
H/SINK	35684-113-710	CUSI 1/2H T0.5
SCREW	37048-130-061	+M3X6 FE FZY
NUT	37208-113-001	1-M3 FE FZY
		ASSY-H/S POWER
	*3H83-00450-000	35683-119-210,2SC3552YC
**Q801	32159-210-004	2SC3552YC-L
H/SINK	35683-119-210	A1050S-H14 T2.0 CX7226
SCREW	37158-230-101	2S-3X10 FE FZY
		ASSY-H/S POWER
	*3H83-00470-000	35682-112-020,TDA3654
IC301	32119-110-016	TDA3654
H/SINK	35682-112-020	A6063 EXTR WHT
BRKT	36614-241-510	SBHG-1 100 T1.0
SCREW	37158-230-101	2S-3X10 FE FZY
		ASSY-H/S TR
	*3H84-00010-007	35684-118-320,MC7805C
**IC803	32119-401-110	MC7805C (AUTO)
H/SINK	35684-118-320	A6063 EXTR BLK H25
SCREW	37158-230-061	2S-3X6 FE FZY
		ASSY-H/S TR
	*3H84-00050-002	35684-118-340,KSC2073
SQ03	32149-301-020	KSC 2073 (AUTO)
H/SINK	35684-118-340	A6063 EXTR BLK H45
SCREW	37158-230-061	2S-3X6 FE FZY
		A S S Y - P O W E R , C O R D
POW/C	33053-816-701	KJP-140/LTCE-2F/8FT
LEAD/C	33058-003-032	S3(2)/F/800
LEAD/C	33059-103-142	P2/D1W/500
S/W-PO	33529-402-007	ESB-99957A/ESB-99957S
HOLD/C	36603-111-310	P.P VO BLK (NEW)
		A S S Y - T R A N S M I T T E R
	*3F14-00031-010	TM31,RM113,53,SS,#066
PWB	33004-550-151	164X54.6X1.2T <S.N.A>
XR2	31099-227-101	MCR18EZHJ101
XR3	31099-227-102	MCR18EZHJ102
XR6	31099-227-103	MCR18EZHJ103
XR4	31099-227-159	MCR18EZHJ1R5
XR5	31099-227-473	MCR18EZHJ473
XR1	31099-227-680	MCR18EZHJ680
XR7	31099-227-682	MCR18EZHJ682
XC1	31607-401-460	CE04W TAPG 16V 47M
XIC1	32109-110-030	SAA3010T
XQ2	32138-077-001	2SD1781KAFR
XQ1	32139-220-005	2SB1197KAHQ
XD1	32309-121-004	KLN 105 BL
XD2	32309-121-004	KLN 105 BL
RUBBER	33142-118-010	SILICONE,TSE2217U,18KEY

Loc No	Supplier Parts No.	Specification
RUBBER	33142-119-010	SILICONE,TSE2217U,42KEY
XZ1	34539-050-010	CSB455EBL/KBR455BKTLR
CASE/T	36031-112-710	ABS HB BLK
CASE/B	36031-112-810	ABS HB BLK
COVER	36152-107-810	ABS HB BLK
SPR/B	36673-104-510	SWPA,NICOATING,FI 0.6,
SPR/B	36673-104-610	SWPA,NICOATING,FI 0.6,
SPR/B	36673-104-710	SUS304,FI 0.6,(COM)
WINDOW	37653-128-210	P.C GE 121-21051
PVC/T	38092-111-010	PVC SHEET 0.3T CLEAR
PE-BAG	38653-108-181	LDPE T0.08 TRANSMITTER
		A S S Y - D O O R
	*3G95-25960-090	HIPS HB BLK #066 CB6226
PWB	33004-146-251	CX6226Z <S.N.A>
RUBBER	33142-114-080	SILICON V0 BLK CX6226
CN10B	33344-211-102	52043-1210
DT+DB	37118-230-061	2S-3X6 FE FZY
DOOR/T	37641-100-810	HIPS HB BLK 96
DOOR/B	37641-100-950	PS HB BK CX6226
PVC/D	38093-109-750	PVC SHEET T0.3 BLK
PVC/D	38093-109-890	PVC SHEET T0.3 BLK
		A S S Y - H O L D , S P E A K E R
	*3H93-52596-010	PP V0 BLK CT-2596
LEAD/C	33050-005-028	Y4/F/700
SPK	34209-200-013	08L03BRA 10W/8R
CASE/S	36031-115-510	PP V0 BLK CT-2596
SCREW	37148-530-121	2S-3X12 FE FZY
		A S S Y - A C C E S S O R Y
CARD/F	38124-121-320	ART PAPER 100,QUELLE
CARD/W	38124-121-790	ART PAPER 120(FTZ)
SVC/N	38134-379-010	ART PAPER 100
I/B	38134-415-310	ART PAPER 120 CX6226WT
PE-BAG	38653-107-410	PE 0.05X141X197 340
PE-BAG	38653-108-191	HDPE T0.015 230X400

Loc No	Supplier Parts No.	Specification

16. EXPLODED-VIEW



CX7226WT/SGX

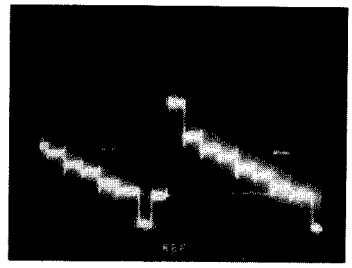
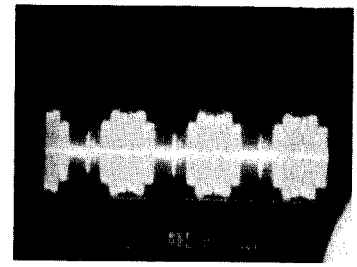
The items with "*" are usually out of stock since they are seldom required for the routine service. There may be some anticipated delay when you order these items.
***** S.N.A = SERVICE NOT AVAILABLE, D.N.A = DO NOT AVAILABLE. *****

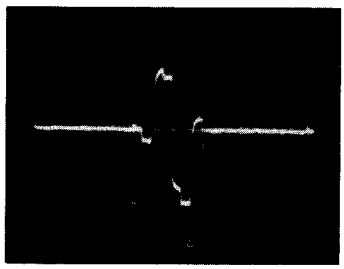
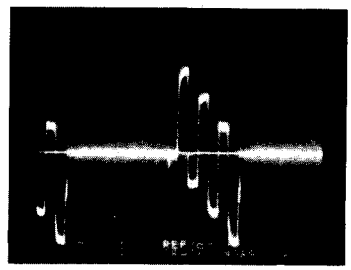
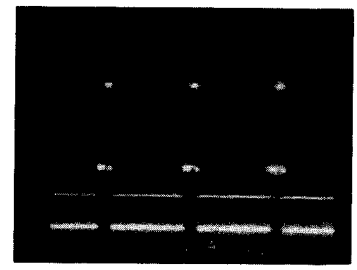
NO	CODE NO	DESCRIPTION	SPECIFICATION	Q'TY
1	38332-106-510	SUN-SCREEN	GLASS T5.0	1
2	36643-101-320	DUAL-LOCK,A	19.1X558X2.9	
	36643-101-410	DUAL-LOCK,B	12.7X150X2.9	1
3	37641-100-950	DOOR-BOTTOM	HIPS HB BLK	1
4	33004-146-251	PWB-DOOR <S.N.A>	194X39X1.0T	1
5	33142-114-080	RUBBER-DOOR	SILICON V0 BLK	1
6	37641-100-810	DOOR-TOP	HIPS HB BLK	1
7	38093-109-890	PVC-DOOR,A	PVC SHEET T0.3 BLK	1
8	38024-179-110	BADGE-BRAND	AL FORGING	1
9	38093-109-690	PVC-CONTROL	PVC SHEET T0.3	1
10	*3G90-29960-130	ASSY-CABINET-FRONT	HIPS HB BLK 677+066	1
	36000-171-050	CABINET-FRONT	HIPS HB BLK	1
11	36698-100-110	CATCH-PUSH,DOOR	KIFUCO,LA701	1
12	36653-102-010	SUPPORT-CRT	ABS HB BLK	1
13	36613-164-611	BRACKET-JACK	SBHG-1 T1.0	1
14	36464-104-210	BOSS-TOP <D.N.A>	HIPS HB BLK	1
15	36602-105-420	HOLDER-CRT,TOP.R	ABS V0 BLK	1
	36602-105-410	HOLDER-CRT,TOP.L	ABS V0 BLK	1
16	37333-101-020	WASHER-GUM,CRT	NATURAL RUBBER BLK	4
17	32019-400-036	CRT-COLOR	A68KPS74X02/72YYB90X(P)	1
18	37208-118-001	NUT-CRT	1-M8 FE FZY	4
19	32479-029-250	COIL-DEGAUSSING	25R T91 L3120	1
20	I T C			
21	*3D32-00010-160	ASSY-PWB,CRT	CX6229T	1
	33004-145-581	PWB-CRT <S.N.A>	P88MS(T), S-60, P58SH	1
22	36000-172-010	CABINET-BACK	HIPS V0 BLK	1
23	38093-110-730	PVC-BACK	PVC SHEET T0.3	1
24	37154-101-210	SCREW-WASHER,SPEC	2S-3X10 FE FZY	3
25	34544-129-510	SHIELD-CASE,TOP	SPTE T0.25	1
26	36635-112-010	CLAMPER-WIRE	NYLON 6.6	1
27	34544-114-010	SHIELD-CASE	SPTE T0.25	1
28	34519-600-017	TUNER	TECC-2929VA15A	1
29	33136-103-030	RECEPTACLE-PERI	HXC-1510-01-300A(R)	1
30	37148-540-101	SCREW-TAP,RH	2S-4X10 FE FZY	1
31	33004-114-320	TERMINAL-SPEAKER	PUSH-4P(PCB)	1
32	00000-010-101	POWER-CORD,AC	KJP-140/LTGE-2F/6FT	1
33	36603-111-310	HOLDER-CORD	P.P V0 BLK	1
34	36601-240-320	HOLDER-SPEAKER,B	HIPS V0 BLK	1
35	37148-530-081	SCREW-TAP,RH	2S-3X8 FE FZY	2

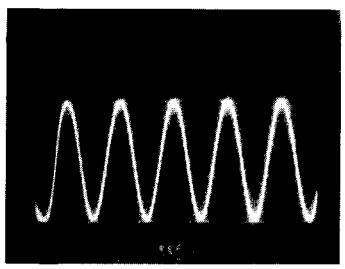
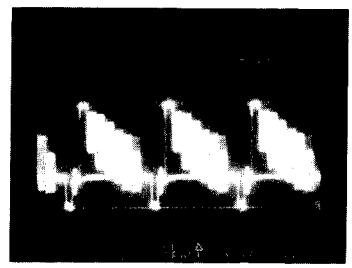
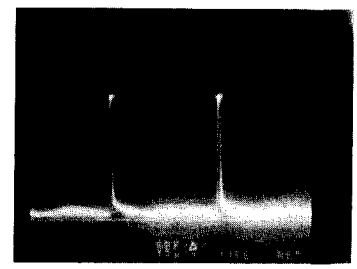
NO	CODE NO	DESCRIPTION	SPECIFICATION	Q'TY
36	36613-164-611	BRACKET-JACK	SBHG-1	1
37	35208-100-310	DAMPER-GEAR	OIL DAMPER	1
38	DELETE ITEM			
39	36464-103-430	BOSS-CABINET <S.N.A>	HIPS HB NATURAL	8
40	38013-116-410	INDICATOR-RMC	PC141-21051	1
41	38013-116-310	INDICATOR-LED	ACRYL CLEAR	1
42	*3D33-00593-470	ASSY-PWB,CONTROL	CX6226Z	1
	33004-146-221	PWB-CONTROL<S.N.A>	CX6226Z	1
43	*3T30-01431-120	ASSY-CHASSIS(OPTION)	CX7226WT/SGX	1
	33004-146-181	PWB-MAIN <S.N.A>	S60 TOP	1
44	*3H84-00020-000	ASSY-H/S,TR	MC7812C	2
45	*3H84-00010-007	ASSY-H/S,TR	MC7805C	1
46	33339-130-002	JACK-RCA,BLOCK	5P Y,W,R	1
47	*3H81-00160-000	ASSY-H/S,SOUND	TA8200AH	1
48	*3H80-00270-003	ASSY-H/S,MAIN	2SD1887	1
49	32859-200-013	TRANS-FLYBACK	FCR-25A005	1
50	*3H83-00450-000	ASSY-H/S,POWER	2SC3552	1
51	*3H83-00470-000	ASSY-H/S,MAIN	TDA3654	1
52	*3H84-00500-002	ASSY-H/S,TR	KSC2073	1
53	36601-238-610	HOLDER-CHASSIS	ABS V0 GRY	1
54	37148-530-121	SCREW-TAP,RH	2S-3X12 FE FZY	8
55	34209-200-013	SPEAKER	08L03BRA 10W/8R	2
56	36031-115-510	CASE-SEMI,DOME	PP V0 BLK	2
57	36073-101-310	LEG-BOTTOM	ABS HB BLK	2
58	36674-135-330	SPRING-COIL	SUS PI0.6	1
59	37623-159-410	KNOB-POWER,MASTER	ABS HB BLK	1
60	36833-101-010	RUBBER-CAP	SILICON HB BLK	2
61	*3D33-00593-480	ASSY-CONT'L,CONNECTOR	CX6226Z	1
	33004-146-241	PWB-CONNECTOR<S.N.A>	CX6226Z	1
62	36613-165-610	BRACKET-DOOR	SBHG-1 T1.0	1
63	36153-101-510	COVER-DOOR	HIPS HB BLK	1
64	38094-102-760	PVC-COVER,DOOR	PVC SHEET T0.3 BLK	1
65	38093-109-750	PVC-DOOR,B	PVC SHEET T0.3 BLK	1
66	37712-115-110	GRILLE-WOOFER	SPC-T0.5 BLK	2
67	36612-111-210	BRKT-SUN,SCREEN.BOT(R)	SPC-1 T1.6	1
	36612-111-220	BRKT-SUN,SCREEN.BOT(L)	SPC-1 T1.6	1
68	*3D50-00002-250	ASSY-PWB,POWER	CX7226W/AMFX	1
	33004-253-071	PWB-POWER<S.N.A>	330X197X1.6T	1

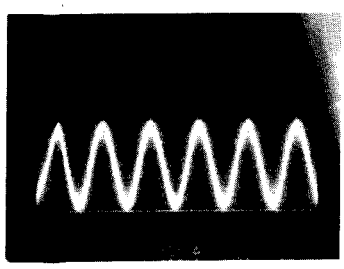
MAIN-PWB

TEST TOINT WAVE FORM

Ident	TP-Y	TP 23
		

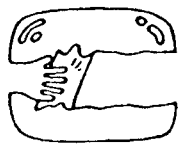
TP-DR	TP-DB	TP 5
		

TP R.L	TP 13 11	V/S
		

TP SC


For Safe Use

1. Read all of these instructions.
2. Save these instructions for later use.
3. Unplug this television receiver from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaning.

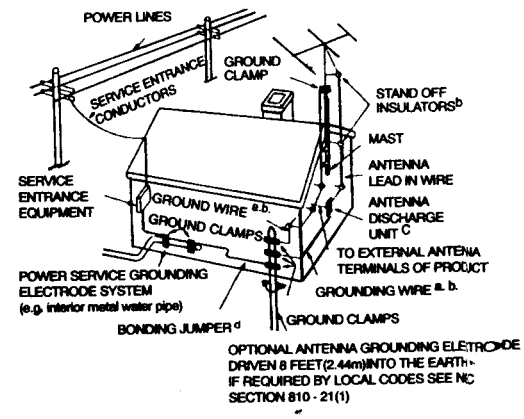


4. Do not use attachments not recommended by the television receiver manufacturer as they may cause hazards.
5. Do not use this television receiver near water for example, near a bathtub, washbowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, etc.
6. Do not place this television receiver on an unstable cart, stand, or table. The television receiver may fall, causing serious injury to a child or an adult, and serious damage to the appliance. Use only with a cart or stand recommended by the manufacturer, or sold with the television receiver. Wall or shelf mounting should follow the manufacturer's instructions, and should use a mounting kit approved by the manufacturer.
7. Solts and openings in the cabinet and the back or bottom are provided for ventilation, and to insure reliable operation of the television receiver and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the television receiver should not be placed in a built-in installation such as a bookcase unless proper ventilation is provided.
8. This television receiver should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supplied to your home, consult your television dealer or local power company. For television receivers designed to operated from battery power refer to the operating instructions.

9. This television receiver is equipped with a polarized alternating-current line plug(a plug having one blade wider than the other.) This plug will fit the power outlet only one way. This is safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose on the polarized plug.

If your television receiver has a threewire grounding-type plug, please note the following. This television receiver is equipped with a 3-wire grounding type plug(a plug having a third(grounding) pin). This plug will only fit into a grounding type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolet outlet. Do not defeat the safety purpose of the grounding plug.

FIGURE 1.
EXAMPLE OF ANTENNA GROUNDING ACCORDING TO NATIONAL ELECTRICAL CODE INSTRUCTIONS CONTAINED IN ARTICLE 810 - "RADIO AND TELEVISION EQUIPMENT"


POWER LINES
SERVICE ENTRANCE CONDUCTORS
GROUND CLAMP
STAND OFF INSULATORS b
MAST
ANTENNA LEAD IN WIRE
SERVICE ENTRANCE EQUIPMENT
GROUND WIRE a, b
GROUND CLAMPS
ANTENNA DISCHARGE UNIT c
TO EXTERNAL ANTENA TERMINALS OF PRODUCT
POWER SERVICE GROUNDING ELECTRODE SYSTEM (e.g. interior metal water pipe)
GROUNDING WIRE a, b
GROUND CLAMPS
BONDING JUMPER d
OPTIONAL ANTENNA GROUNDING ELETRODE DRIVEN 8 FEET(2.44m)INTO THE EARTH IF REQUIRED BY LOCAL CODES SEE NC SECTION 810 - 21(1)

NOTES :

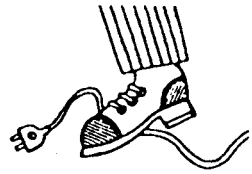
a. Use No. 10 AWB(5.3mm2) copper, No. 8 AWG(8.4mm2) aluminum. No. 17 AWG(1. 0mm2) copperclad steel or bronze wire, or larger, as a ground wire.

b. Secure antenna lead-in and groundwires to house with stand-off insulators spaced from 4-6 feet(1.22-1.83m) apart.

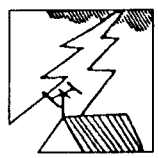
c. Mount antenna discharge unit as close as possible to where lead-in enters house.

d. Use jumper wire not smaller than No. 6 AWG(13.3mm^2) coppper, or the equivalent, when a separate antennagrounding electrode is used.

10. Do not allow anything to rest on the power cord. Do not locate this television receiver where the card will be abused by persons walking on it.



11. Follow all warnings and instructions marked on the television receiver.
12. If an outside antenna is connected to the television receiver, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges. Section 810 of the National Electrical Code, NFPA No. 70-1975, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of gounding conductors, location of antennadicharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Figure 1.



13. For added protection for this television receiver during a lightening storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna. This will prevent damage to the receiver due to lightning and power-line surges.
14. An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outside antenna system extreme care should be taken to keep from touching, such power lines or circuits as contact with them might be fatal.
15. Do not overload wall outlets and extension cords as this can result in fire or electric shock.
16. Never push objects of any kind into this television receiver through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a fire or electronic shock. Never spill liquid of any kind on the television receiver.
17. Do not attempt to service this television receiver yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
18. Unplug this television receiver from the wall outlet and refer servicing to qualified service personnel under the follwing conditions:
    a. When the power cord or plug is damaged or frayed.
    b. If liquid has been spilled into the television receiver.
    c. If the television receiver has been exposed to rain or water.
    d. If the television receiver does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the television receiver to normal operation.
    e. If the television receiver has been dropped or the cabinet has been damaged.
    f. When the television receivers exhibits a distinct change in perfomance-this indicates a need for service.
19. When replacement parts are required, be sure the series technician has used replacement parts specified by the manufacturer that have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.
20. Upon completion of any service or repairs to this television receiver, ask the service technician to perform routine safety checks to determine that the television is in safe operating condition.
21. Television equipment and car combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the equipment and cart combination to overturn.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by visual inspection and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. The replacement parts which have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by shading on the schematic diagram and the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of subsititute parts which do not have the same safety characteristics in the parts list may create a shock, fire,X- radiation or other hazards.

SERVICE NOTES

1. When replacing the parts or the circuit boards, clamp the lead wires to the terminals before soldering.
2. When replacing a high wattage resistor (oxide metal film resistor) in the circuit board, keep the resistor 10mm (1/2 in) away from the circuit board.
3. Keep the wires away from high voltage or high temperature components.
4. If any fuse in this TV receiver is blown, replace it with the FUSE specified in the chassis parts list.

The lighting flash and arrowhead within the triangle is a warning sign alerting you of "dangerous voltage" inside the product.

CAUSION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION : To reduce the risk of electric shock, do not remove cover (or back) no user serviceable parts inside. Refer servicing to qualified service personnel.

The exclamation point within the triangle is a warning sign alerting you of important instructions accompanying the product.

X-RADIATION PRECAUTION

1. The excessive high voltage can produce potentially hazardous X- RADIATION. To avoid such hazards, the high voltage must not exceed the specified limit. The norminal value of the high voltage of this receiver is 24.0KV at zero beam current (minimum brightness). The high voltage must not, under any circumstances, exceed 30KV. Each time a receiver requires servicing and the high voltage should be checked following the HIGW VOLTAGE CHECK procedure in this manual. It is recommended that the reading of the high voltage should be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter. This receiver is equipped with a Fail Safe (FS)circuit which prevents the receiver from producing an excessively high voltage even if the B^+ voltage increases abnormally. Each time the receiver is serviced, the FS circuit must be checked to determine that if the circuit is properly functioning, following the FS CIRCUIT CHECK procedure in this manual.
2. The only source of X-RADIATION is this TV receiver. It is the picture tube. For continued X-RADIATION protection. the replacement tube must be exactly the same type as specified in the parts list.
3. Some parts in this receiver have special safety related characteristics for X-RADIATION protection. For continued safety, the parts replacement should be undertaken only after referring to the PRODUCT SAFETY NOTICE.

SAFETY PRECAUTION

Warning : The serivce should not be attempted by anyone unfamiliar with the necessary precautions in this receiver. The followings are the necessary precautions to be observed before servicing.

Since the chassis of this receiver is directly connected to the AC power line-(Hot chassis) ,an isolation transformer should be used during any dynamic service to avoid possible shock hazards.

1. Always discharge the picture tube anode to the CRT conductive coating before handling the picture tube. The picture tube is highly evacuated and if broken, the glass fragments will be violently expelled. Use shatterproof goggles and keep the picture tube away from the bare body during a handling.
2. When replacing a chassis in the cabinet, it is always certain that all the protective devices are put back in place, such as non - metallic control knobs, insulating covers, shields, isolation resistor-capacitor network, etc.
3. Before returning the set to the customer, always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as antennas, terminal, screwheads, metal overlays, control shafts, etc. To be sure the set is safe to operate without danger of electrical shock. Plug the AC line cord directly to the AC outlet (do not use a line isolation transformer during this check). Use an AC voltmeter having 5000 ohm per volt or more sensitivity in the following manner. Connect a 1500 ohm 10 watt resistor, paralleled by a 0.15μF, AC type capacitor, between a good earth ground(water pipe, conduit etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500 ohm resistor and 0.15μF capacitor. Reverse the AC plug at the AC outlet and repeat the AC voltage measurements for each exposed metallic part. The measured voltage must not exceed 0.3 volts RMS. This corresponds to 0.5 milliamp AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.

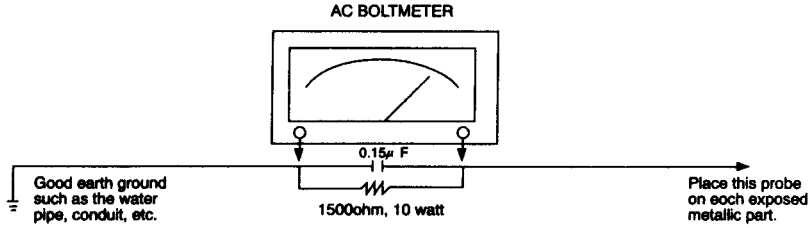
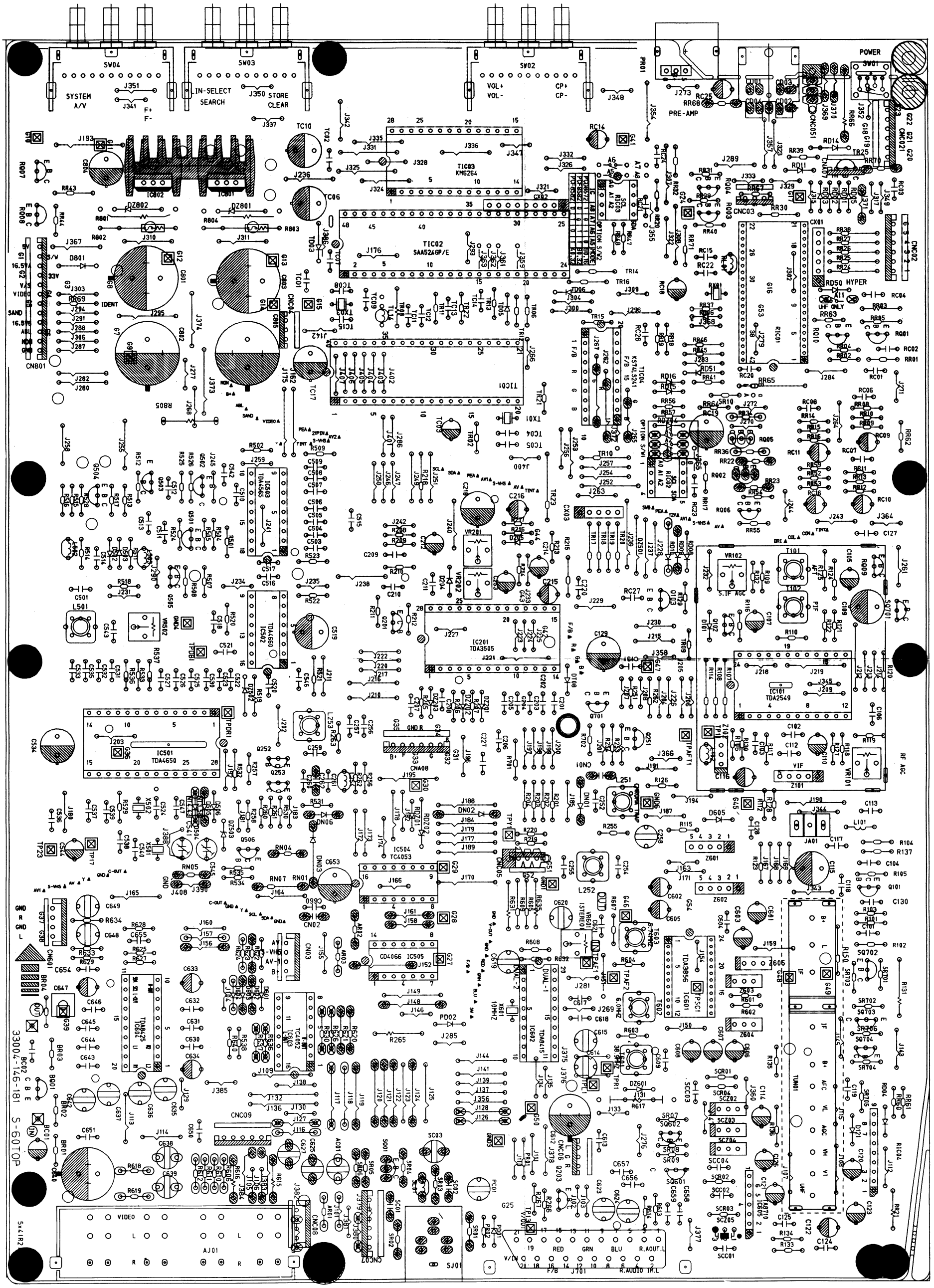
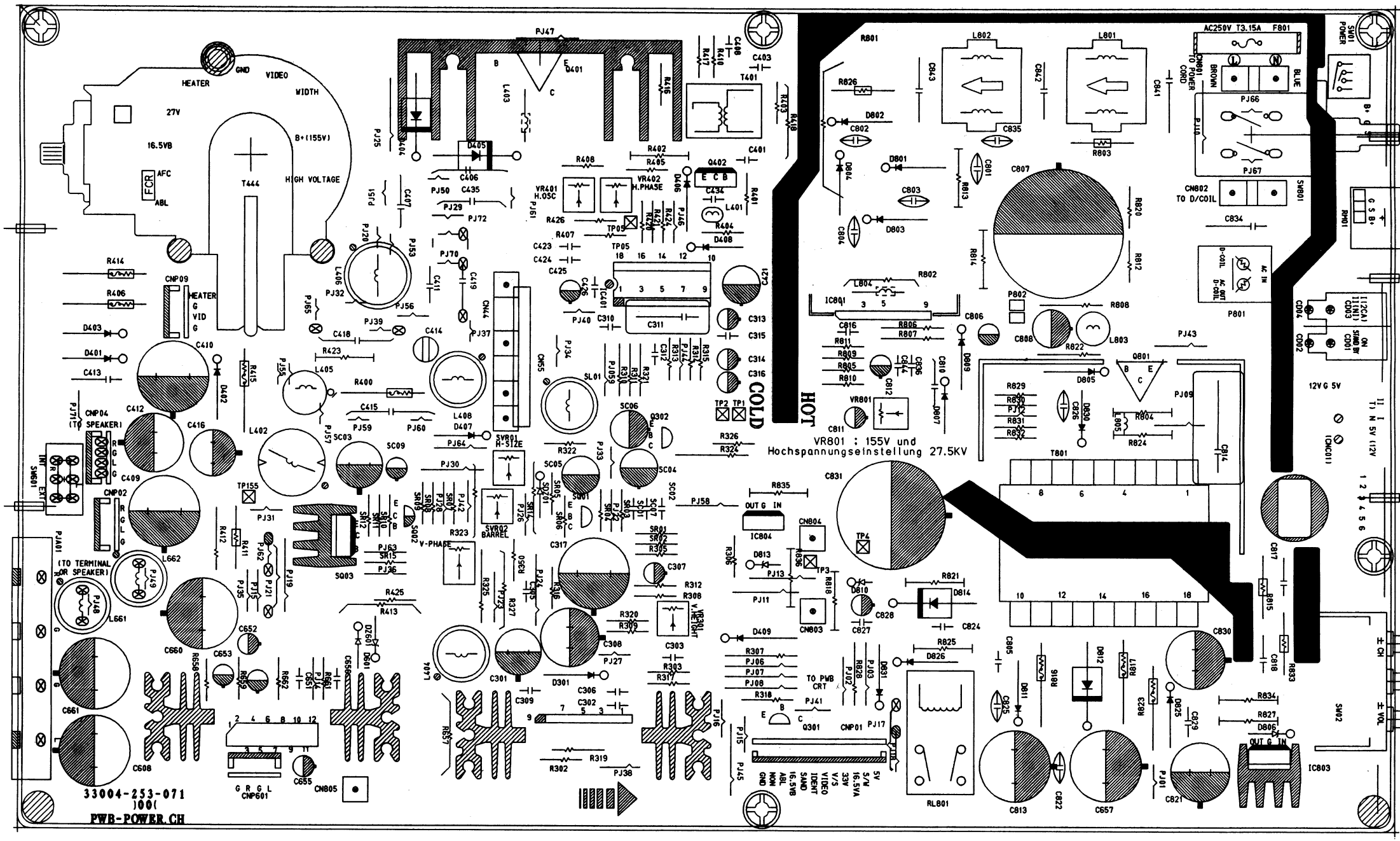

AC BOLTMETER
0.15μ F
Good earth ground such as the water pipe, conduit, etc.
1500ohm, 10 watt
Place this probe on each exposed metallic part.

Figure 1. AC Leakage Current Check

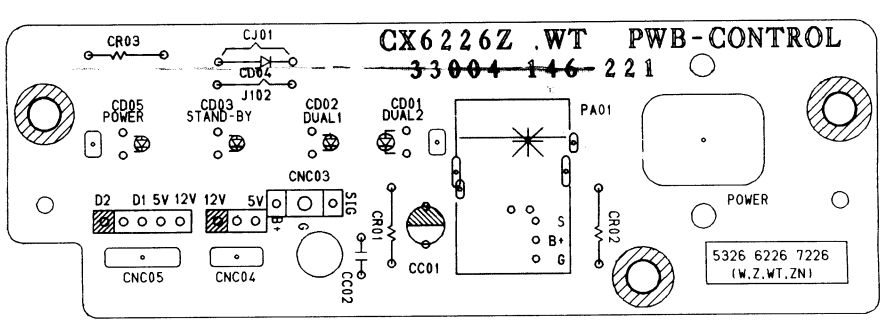
PWB-MAIN


SW04
SW03
SW02
SYSTEM A/V
IN-SELECT SEARCH
STORE CLEAR
VOL+ VOL-
CP+ CP-
POWER
SW01
PRE-AMP
TIC03 KM6264
TIC02 SAA5246P/E
TIC01
IC201 TDA3505
IC501 TDA4650
IC502 TDA4660
IC503 TDA4565
IC504 TC4053
IC505 CD4066
IC101 TDA2549
IC601 TDA3856
IC602 TDA8415
IC603 TC4052
IC604 TDA8425
IC605 A8710
TIC04 K574L5241
CN801
CN601
CN02
CN03
AJ01
SJ01
PC01
Z101
Z601
Z602
Z603
Z604
Z605
JA01
RD50 HYPER
VIF
RF AGC
S.IF AGC
PIF
OPTION S/W
IDENT
SAND
VIDEO
PRE-AMP
CHROMA TRAP
F/B
R.AOUT.L
RED
GRN
BLU
V/IN
3300-146-181 S-60TOP

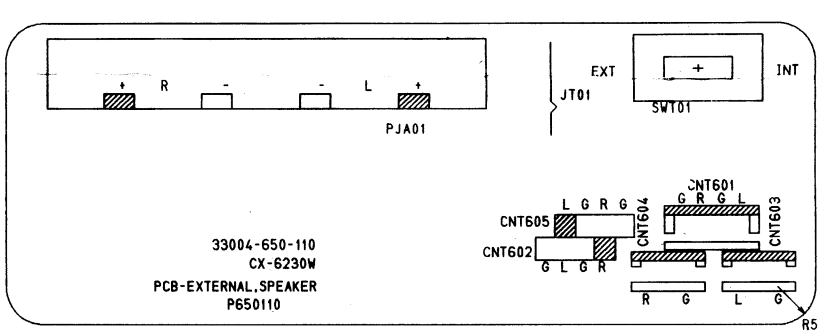
PWB-POWER



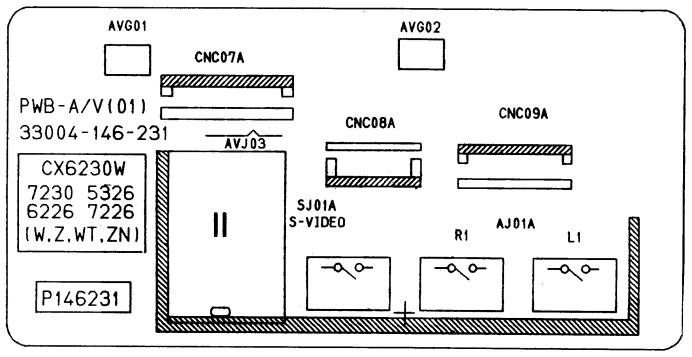
PWB-CONTROL



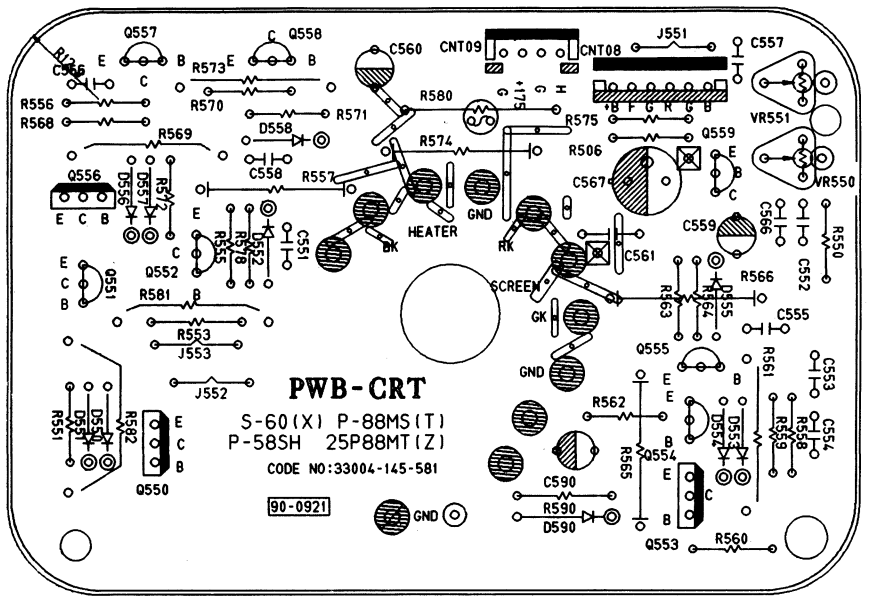
SPK-JACK



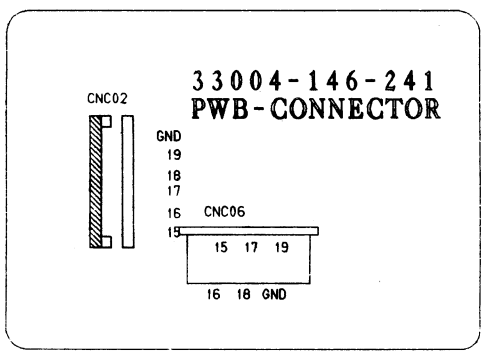
PWB-A/V



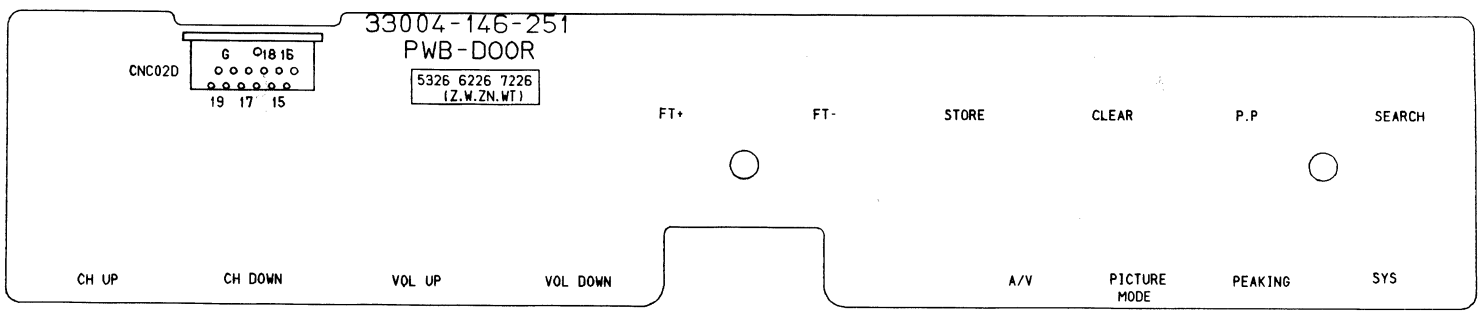
PWB-CRT



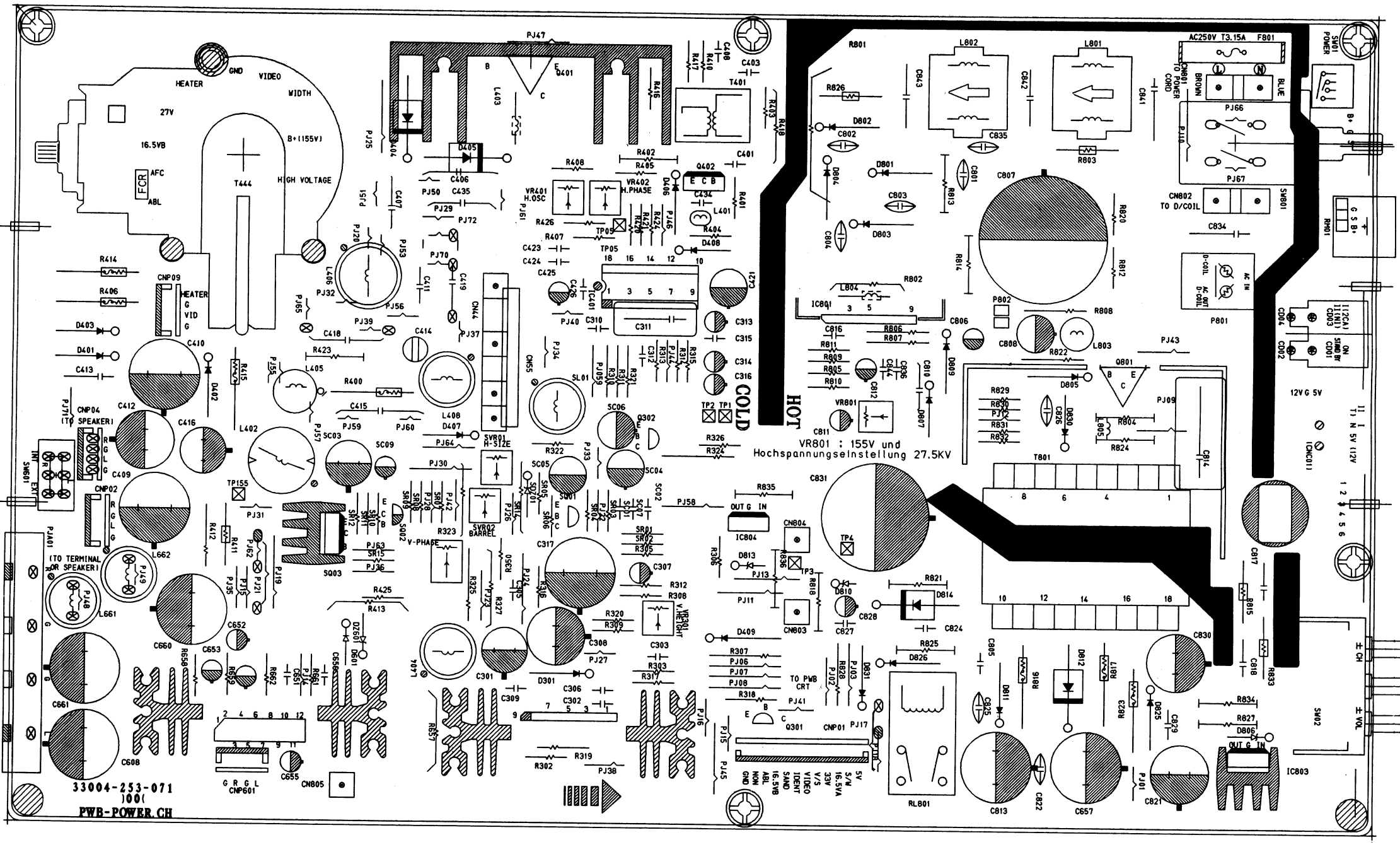
CONNECTION



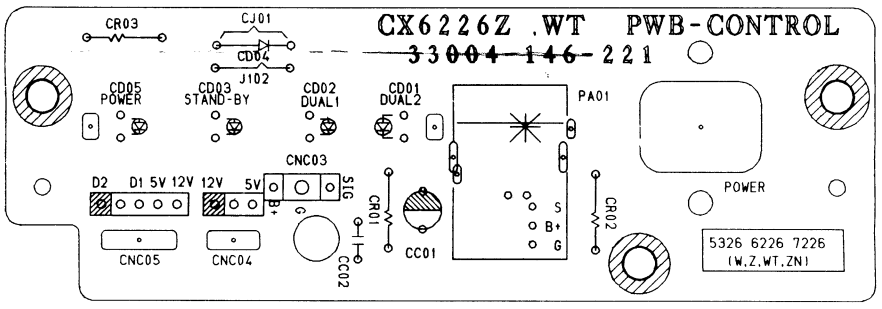
PWB-DOOR



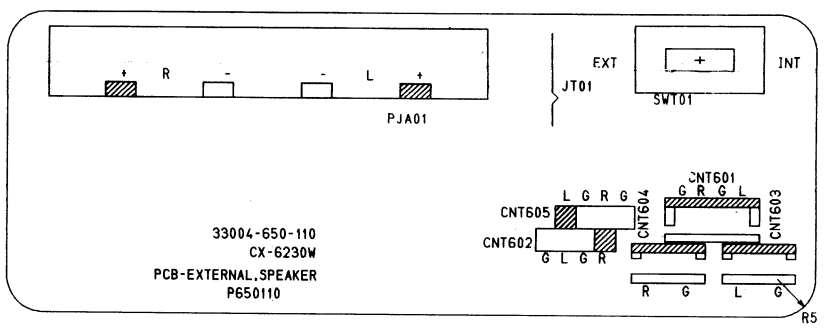
PWB-POWER



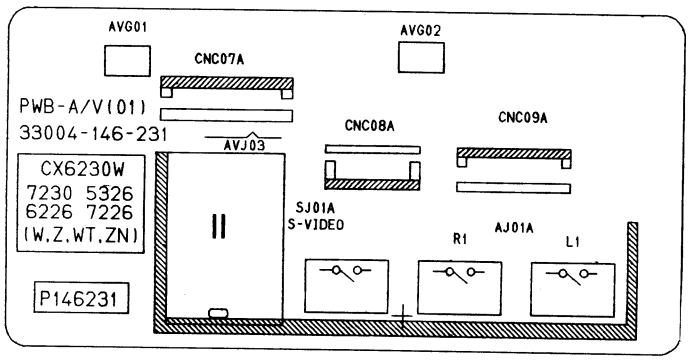
PWB-CONTROL



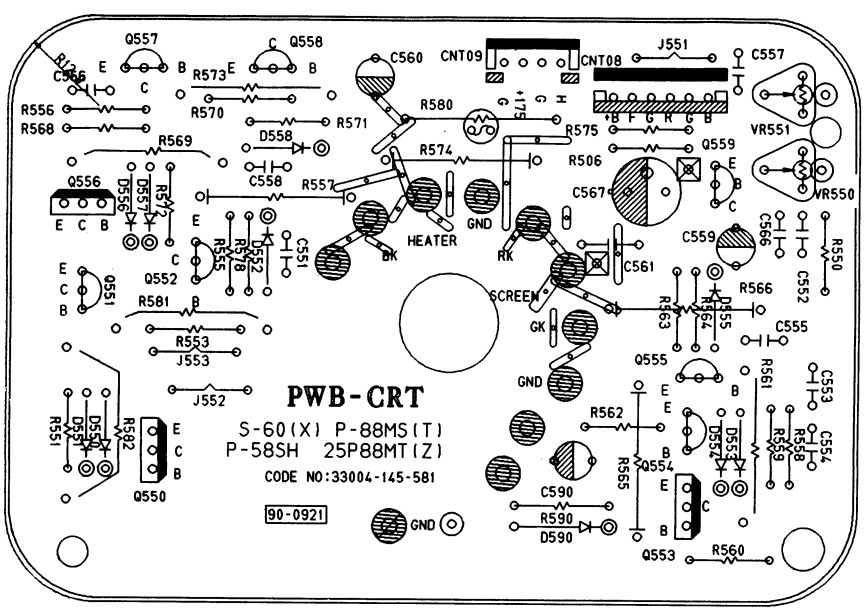
SPK-JACK



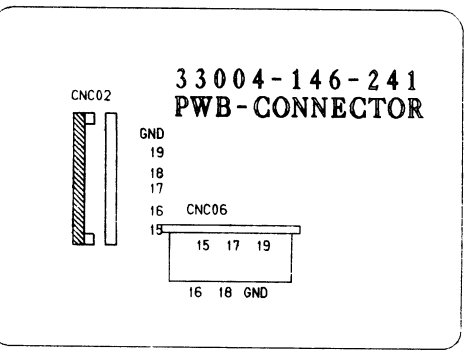
PWB-A/V



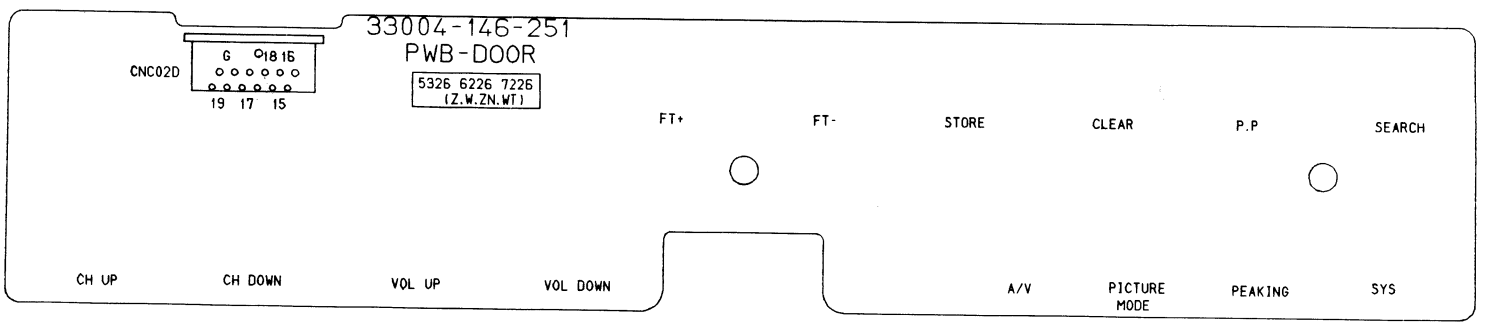
PWB-CRT



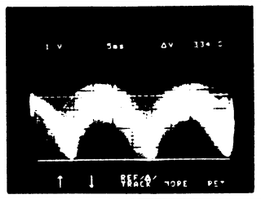
CONNECTION



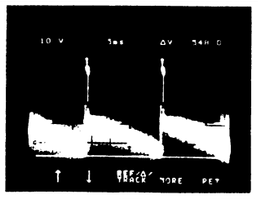
PWB-DOOR



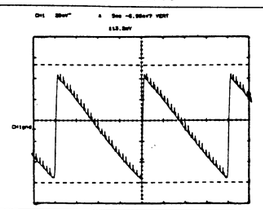
TP-V 1



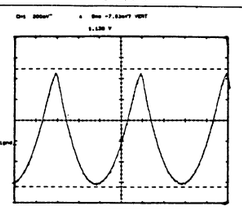
TP-V 2



TP-VERT



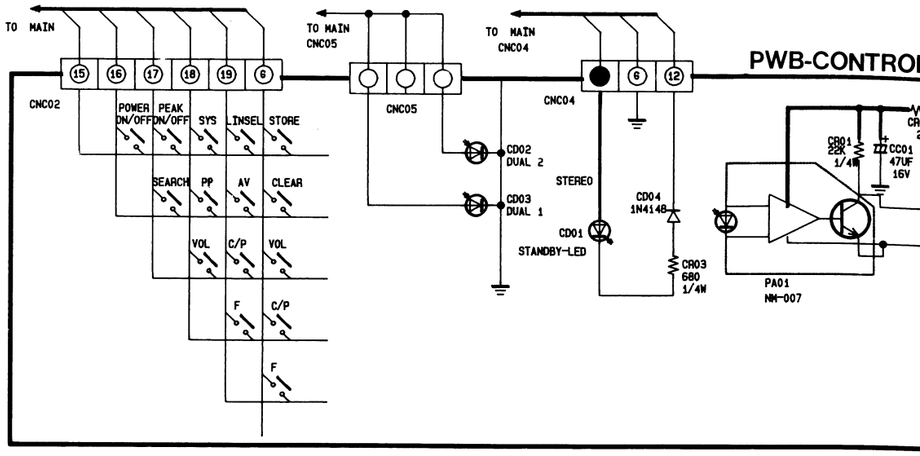
TP-SQ03



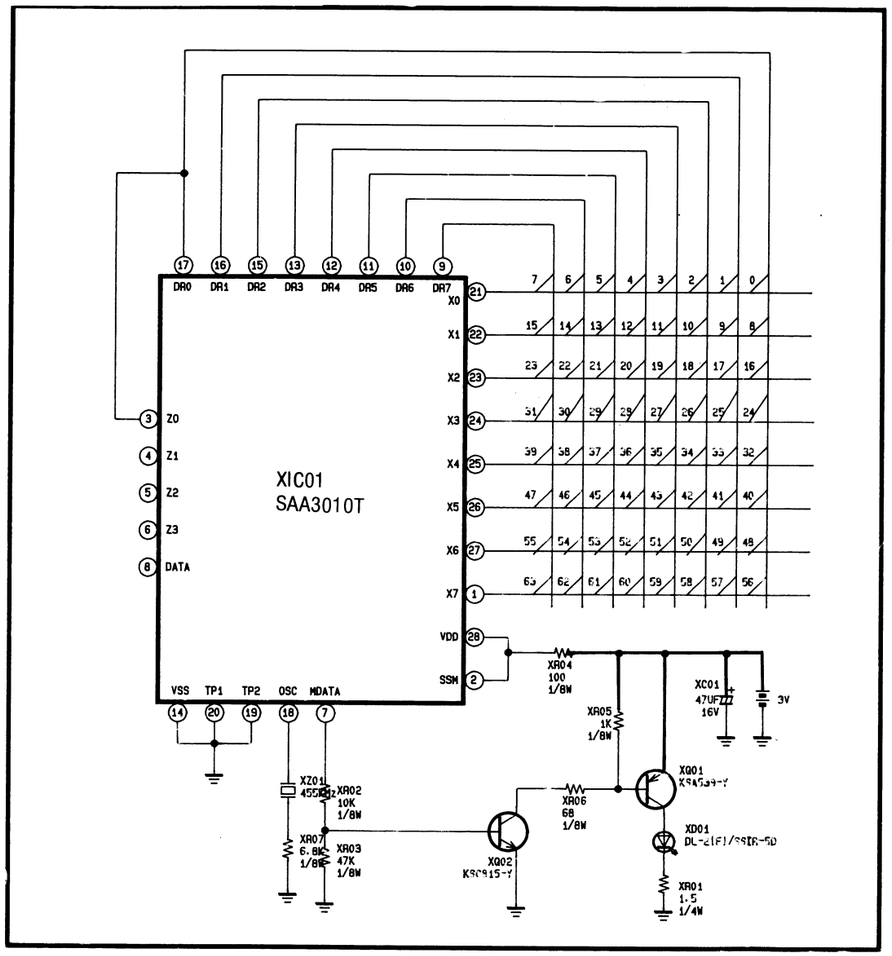
$ MARK OPTION

LOCATION	TOSHIBA CRT	PHILIPS CRT
R302	1/2W 330	1/2W 560
R305	1/8W 47K	1/8W 43K
R308	1/8W 3K	1/8W 3.6K
R312	JUMPER	1/8W 220
R309	1/2W 2	1/2W 1
R320	1/2W 0.68	1/2W 1
R321	1/4W 510	1/4W 1K
R411	1/2W 110K-F	1/2W 120K-G
L405	62mH	22mH
R311	130K	150K

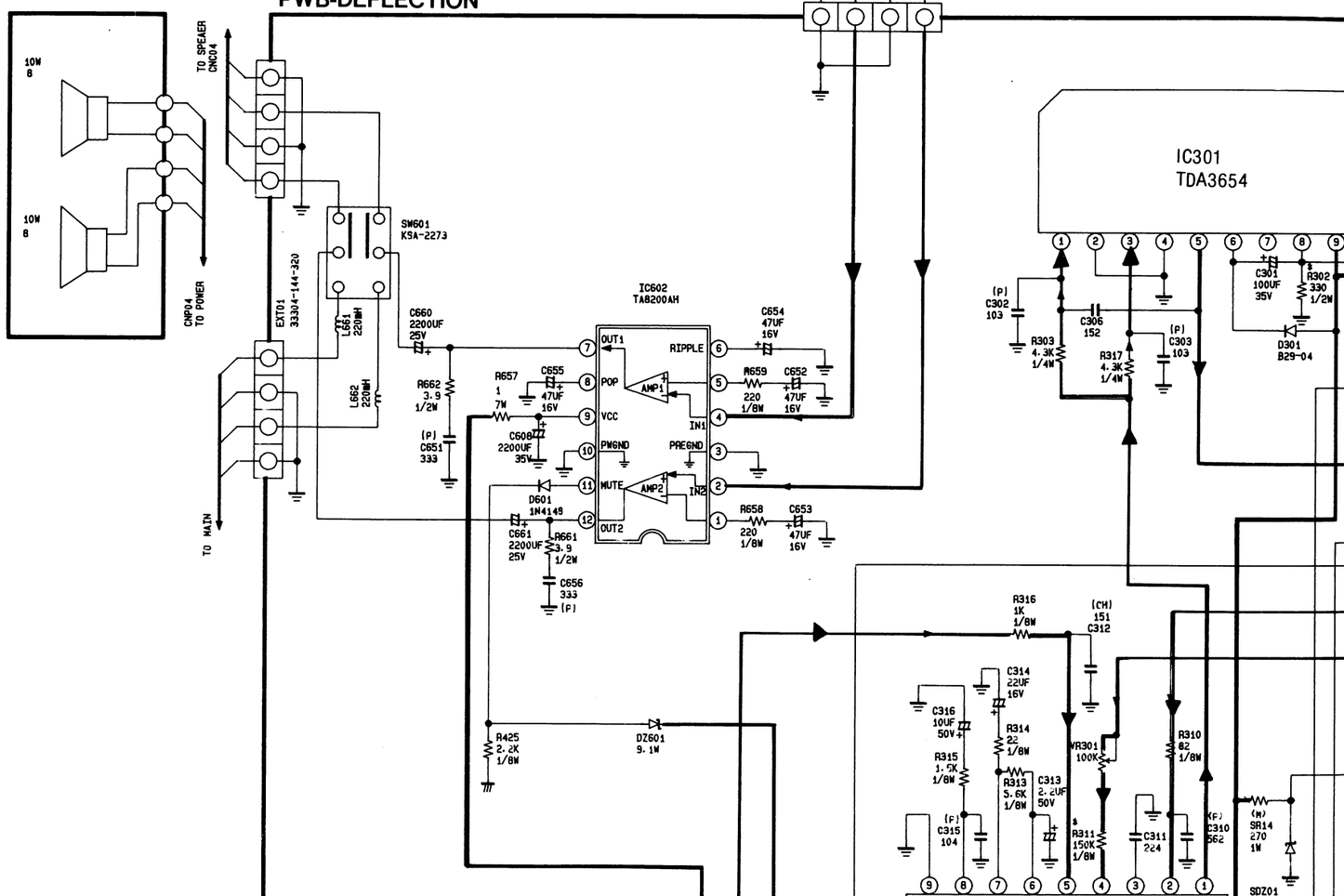
PWB-CONTROL

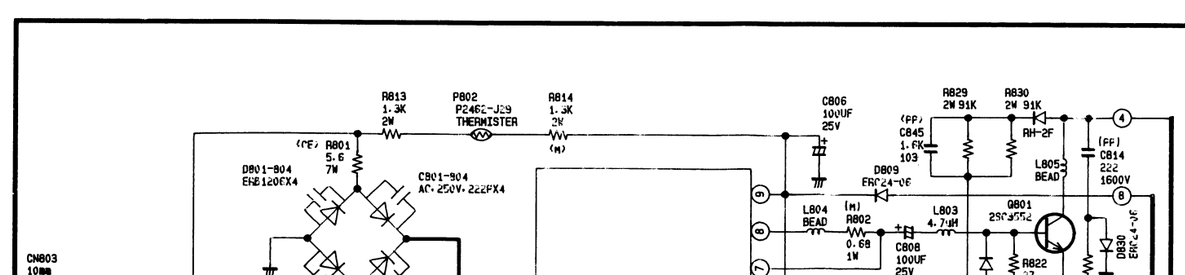


PWB-TRANSMITTER



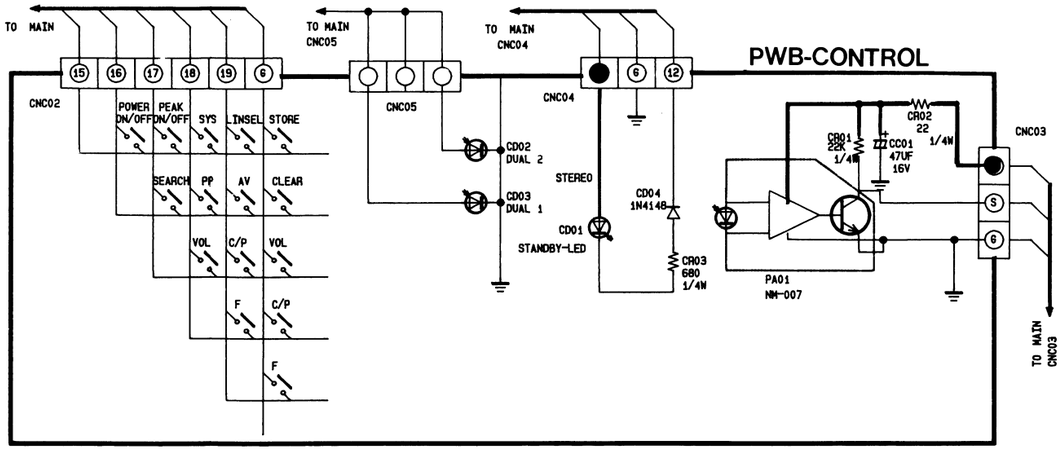
PWB-DEFLECTION

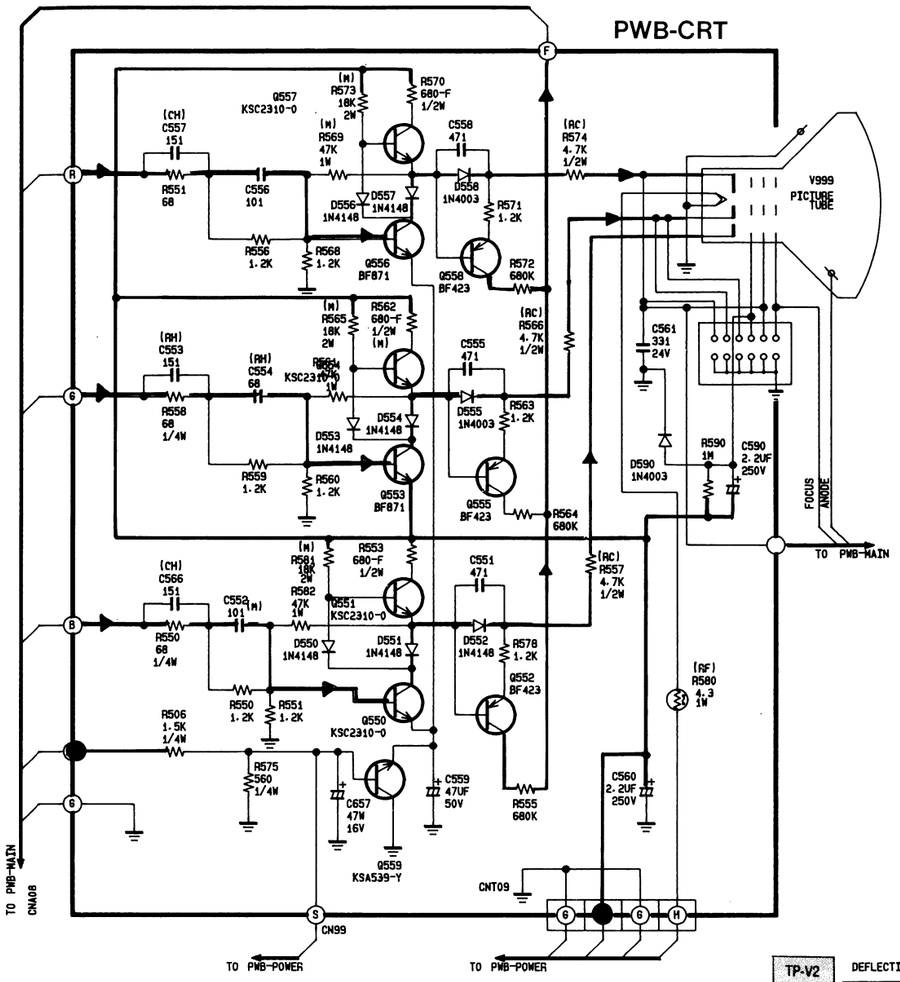


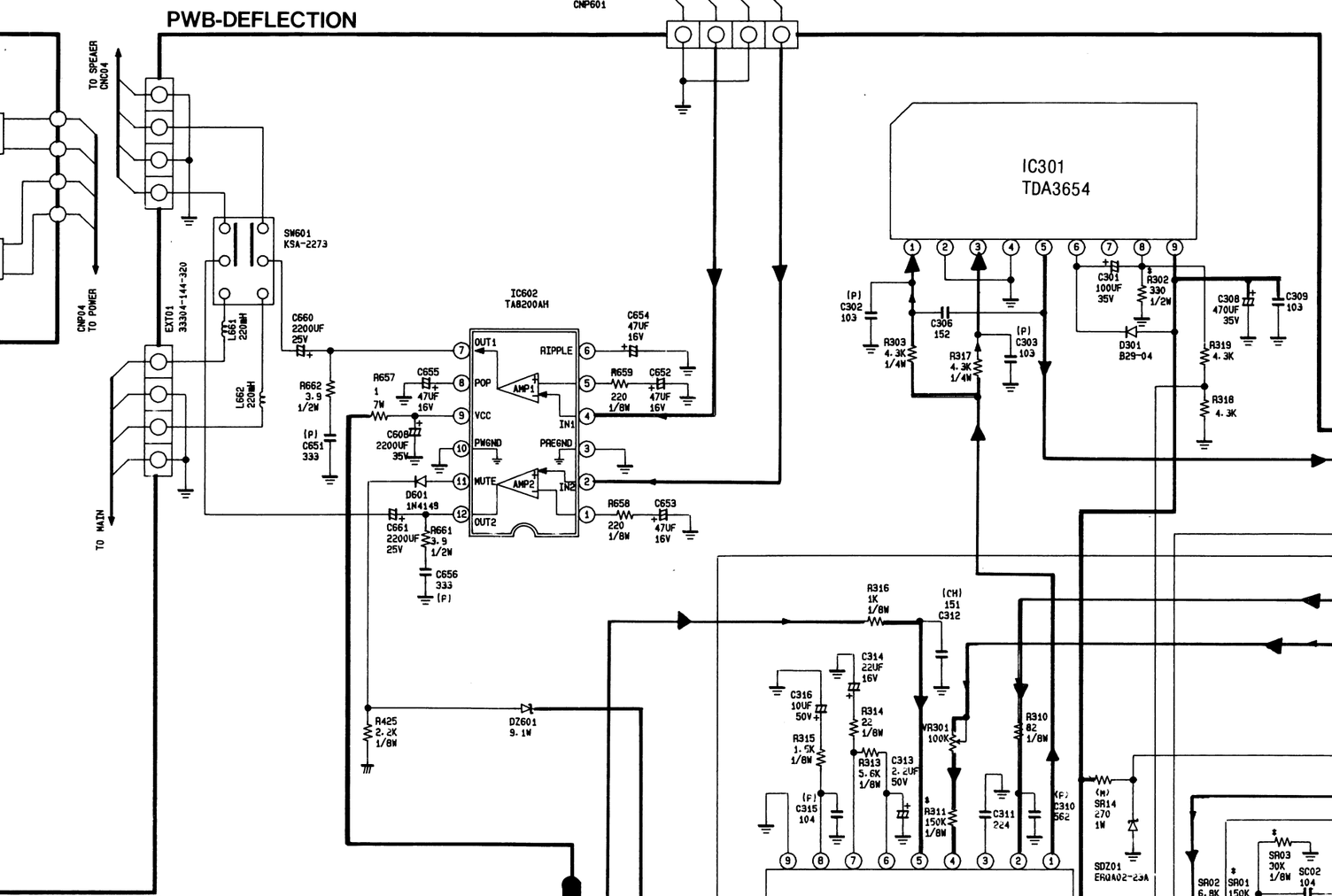


* MARK OPTION

LOCATION	TOSHIBA CRT	PHILIPS CRT
R302	1/2W 330	1/2W 560
R305	1/8W 47K	1/8W 43K
R308	1/8W 3K	1/8W 3.6K
R312	JUMPER	1/8W 220
R309	1/2W 2	1/2W 1
R320	1/2W 0.68	1/2W 1
R321	1/4W 510	1/4W 1K
R411	1/2W 110K-F	1/2W 120K-G
L405	62mH	22mH
R311	130K	150K







IC401
TDA2579A/NB

IC803
MC78120

SDZ01
ERQA02-23A

TP-VERT

TP-SQ03

TV-V1

CN44

T444
FCR25A005

ANODE

FOCUS

SCREEN

COLD

TO MAIN

TO CRT

CN99

CNP801
12P

CNP09
4P

TO CNT09

TO MAIN
CN801

XIC01
SAA3010T

IC801
TDA4601

IC401
TDA2579A/NB

HOT

COLD

TO MAIN
CNA07

TO MAIN
CN801

TO CRT

CN99

CNP801
12P

SW801

CN803
10mm

CN802
10-10-8mm

CN801

F801
250V. AC. T3. 15A

P801
PTH451C02
POSISTOR

P802
P2462-J29
THERMISTER

D801-804
ERB120EX4

C801-804
AC. 250V. 222PX4

L810
D-COIL

L801
39mH

L802
6mH

BLUE

BROWN

T801

Q301
KSC-815-Y

Q401
2SC2073

Q801
2SC3552

XQ01
KSA539-Y

XQ02
KSC915-Y

T401
020-010

IC803
MC7912C

D601
1N4149

D826
1N4003

D831
1N4003

D406
1N4003

DZ601
9.1W

SDZ01
ERQA02-23A

NL901

TO MAIN

SCHEMATIC DIAGRAM

CHASSIS· S60MT
SYSTEM: CK, CX

CN601

CN02 TO CONTRAL BOARD (CNC 02)

LEFT(AV)

RIGHT(AV)

TP-L

TP-R

TP-SC

F/B
RED
GREEN
BLUE

(OSD)
R
G
B
F/B

BRIGHT
CONTRAST
COLOR

SCL

SDA

SYS3

S/M

R-OUT

L-OUT

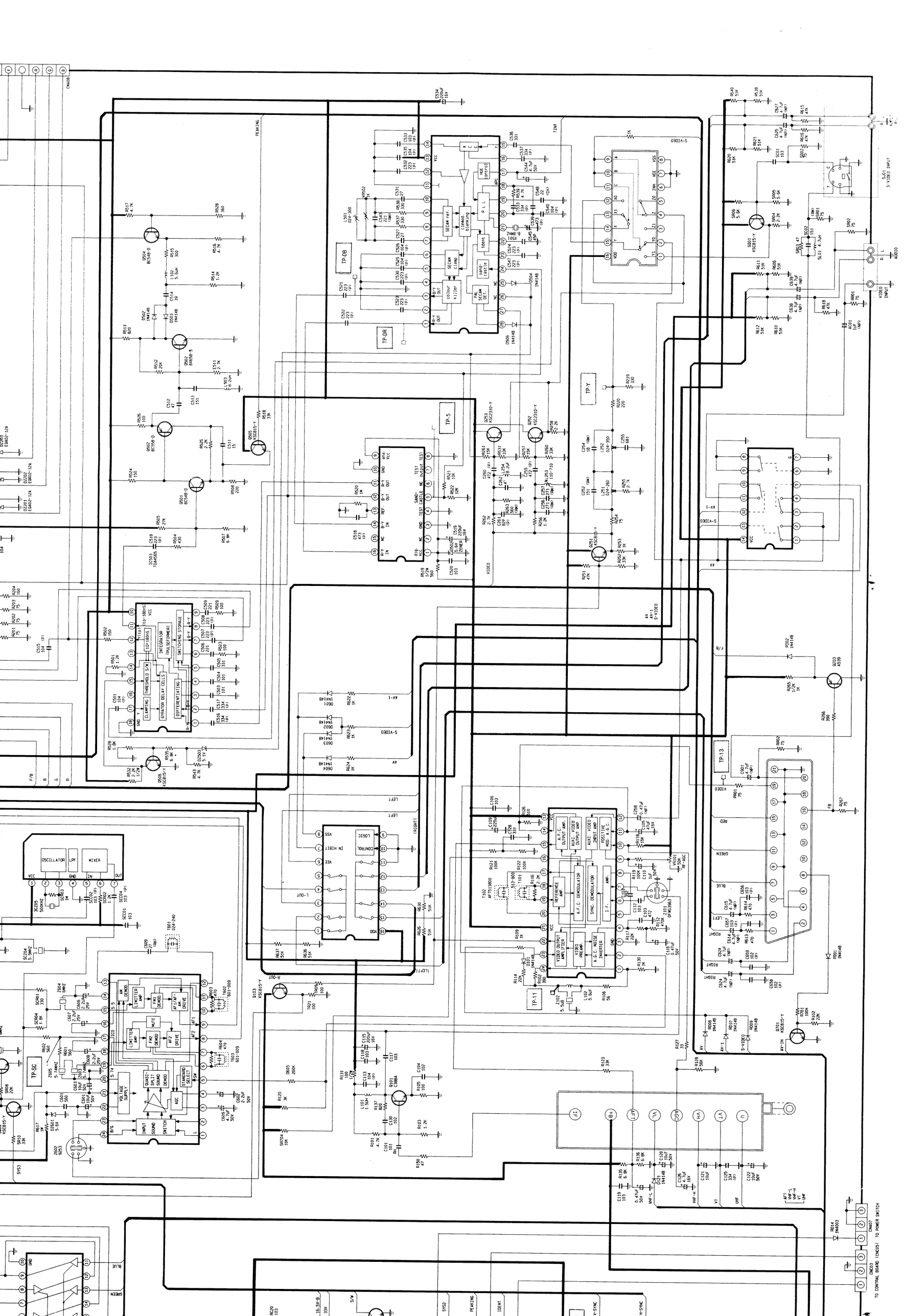
AV

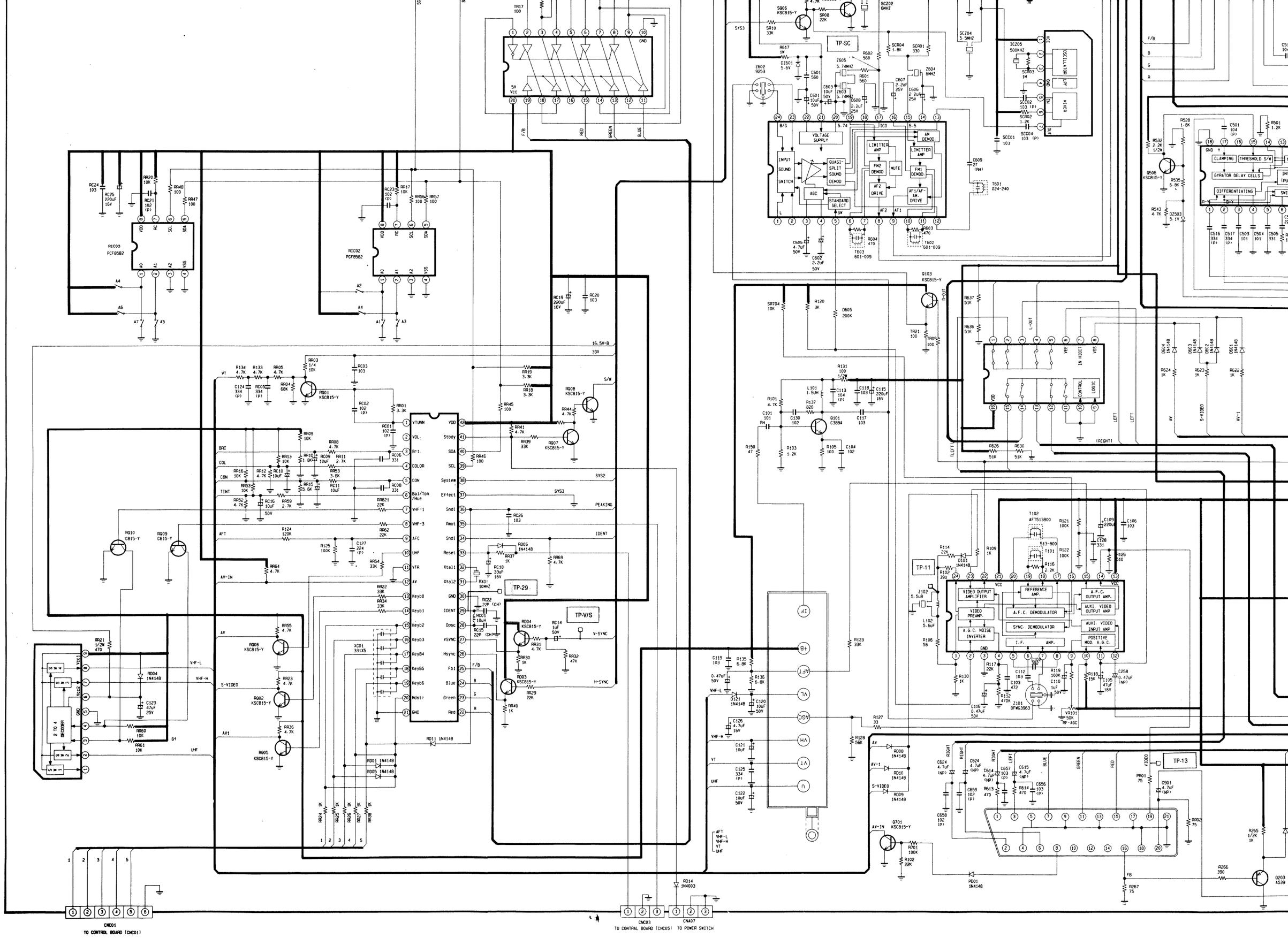
S-VIDEO

AV-1

DIFFERENT PARTS

		CX6226W		CX7226W	
	Loc-No	DESCRIPTION	SPECIFICATION	DESCRIPTION	SPECIFICATION
PWB-POWER	SR02	R-CARBON	1/4T 6.8K-J	-	-
	SR03	R-CARBON	1/4T 30K-J	R-CARBON	1/4T 13K-J
	SR04	R-CARBON	1/4T 220K-J	R-CARBON	1/4T 91K-J
	SR05	R-CARBON	1/4T 10K-J	R-CARBON	1/4T 8.2K-J
	SR10	R-CARBON	1/4T 3K-J	R-CARBON	1/4T 2.4K-J
	R350	R-CARBON	1/2T 680-J	R-CARBON	1/2T 560-J
	R316	-	-	R-CARBON	1/4T 390-J
	R403	R-METAL	1T 1.2K	R-CARBON	1/2T 390-J
	SG02	C-POLYESTER	104J 63V	C-POLYESTER	63V 154K
	G317	C-ELECT	25V 2200M	C-ELECT	35V 2200u
	G435	C-POLY	1600V 0.0033	C-POLY	1600V 0.0039
	G411	C-M.POLY	200V 0.22	C-M.POLY	200V 434
	G418	C-POLY	200V 0.15	C-POLY	200V 0.1
	G415	C-M.POLY	400V 824	C-M.POLY	250V 684
	Q401	TR	2SD1886	TR	2SD1887
	H/POWE	-	-		A1050S-H145
PWB MAIN	TR23	R-CARBON	1/8T 47K	R-CARBON	1/8T 100K
	TUN01	TUNER	ECC-2885CED	TUNER	TECC-2989VA15
	RD50	-	-	DIODE	1N4148
	RR04	R-CARBON	1/8T 68K	-	-


TO CONTRAL BOARD (CNC05)
TO POWER SWITCH
CN407
CN403
S-VIDEO INPUT
AUDIO
VIDEO
TP-UB
TP-DR
TP-5
TP-Y
TP-11
TP-13
TP-SC
OSCILLATOR
LPF
MIXER
VCC
GND
IN
OUT
SECAM ref.
SECAM clamp
colour killer
clamp blanking
Ident
PAL SECAM DEC
P L L
HUE control
APC
LOGIC
CONTROL
VDD
VSS
VEE
INH
REFERENCE AMP.
A.F.C. DEMODULATOR
SYNC. DEMODULATOR
I.F. AMP.
A.F.C. OUTPUT
AUX1 VIDEO OUTPUT AMP.
AUX1 VIDEO INPUT AMP.
POSITIVE SYNC SEP.
VIDEO OUTPUT AMPLIFIER
VIDEO PRE-AMP.
A.G.C. NOISE INVERTER
JAM DEMOD.
LIMITTER AMP.
FM DEMOD.
AFT/AF-1 DRIVE
MUTE
AF2 DRIVE
VOLTAGE SUPPLY
QUASI-SPLIT SOUND DEMOD.
AGC
STANDARD SELECT
SW
INPUT SOUND SWITCH
INTEGRATOR
PULSEFORMER
SWITCHING STORAGE
THRESHOLD S/W
CLAMPING
GYRATOR DELAY CELLS
DIFFERENTIATING
PEAKING
TINT
LEFT
RIGHT
RED
GREEN
BLUE
AV
AV-1
S-VIDEO
AV-IN
VIDEO
AUDIO
SYS1
SYS2
SYS3
H-SYNC
V-SYNC
+6.5V-B
+33V
S/M
F/B
B/G
L-OUT
R-OUT
IF
B+
AFT
VL
AGC
VH
VT
U
VHF-L
VHF-H
UHF
VT


TR17
180
GND
5V
Vcc
RED
GREEN
BLUE
F/B
SCZ02
6MHZ
S906
KSC815-Y
SR08
22K
SYS3
SR10
33K
TP-SC
SCR04
1.8K
SCR01
330
SCZ04
5.5MHZ
SCZ05
500KHZ
SCR03
1M
SCC02
103 (P)
SCR02
1.2K
SCC04
103 (P)
SCC01
103
R617
1W
DZ601
5.6V
C601
560
Z602
9253
Z605
5.74MHZ
R602
560
R601
560
Z604
6MHZ
C607
2.2uF
25V
C606
2.2uF
25V
C603
10uF
50V
Z603
5.74MHZ
C608
2.2uF
25V
C601
10uF
50V
B/G
VOLTAGE SUPPLY
5.74
ICO
5.5
AM DEMOD.
LIMITTER AMP
LIMITTER AMP
INPUT SOUND SWITCH
QUASI-SPLIT SOUND DEMOD
FM2 DEMOD
MUTE
FM1 DEMOD
AF2 DRIVE
AF1/AF-AM. DRIVE
AGC
STANDARD SELECT
SW
L
AF2
AF1
C509
27
(RH)
T601
024-240
C505
4.7uF
50V
C602
2.2uF
50V
R604
470
T603
601-009
R603
470
T602
601-009
R528
1.8K
R532
2.2K
1/2W
Q506
KSC815-Y
R535
6.8K
R543
4.7K
DZ503
5.1V
C501
104
(P)
R501
1.2K
GND
Y
CLAMPING
THRESHOLD S/W
GYRATOR DELAY CELLS
DIFFERENTIATING
R-Y
B-Y
C516
334
(P)
C517
334
(P)
C503
101
C504
101
C505
331
RC24
103
RC25
220uF
16V
RR20
10K
RC21
102
(P)
RR48
100
RR47
100
RIC03
PCF8582
VDD
RC
SCL
SDA
A0
A1
A2
VSS
A4
A6
A7
A5
RC23
102
(P)
RR17
10K
RR56
100
RR57
100
RIC02
PCF8582
A2
A4
A1
A3
RC19
220uF
16V
RC20
103
16.5V-B
33V
VT
R134
4.7K
R133
4.7K
RR05
4.7K
RR03
1/4
10K
RC03
103
C124
334
(P)
RC05
334
(P)
RR04
68K
RQ01
KSC815-Y
RC02
102
(P)
RR01
3.3K
RC01
102
(P)
RR19
3.3K
RR18
3.3K
RR45
100
RR41
4.7K
RR39
33K
RQ07
KSC815-Y
RQ08
KSC815-Y
RR44
4.7K
S/W
RR09
10K
BRI
RR08
4.7K
RR13
10K
RR10
1.8K
RC09
10uF
RR11
2.7K
RC06
331
COL
RR16
10K
RR12
4.7K
RC10
10uF
RR53
3.6K
RC11
10uF
CON
RR15
5.6K
RR53
10K
RR52
4.7K
RC16
10uF
50V
RR59
2.7K
TINT
RC08
331
RR621
22K
RR62
22K
AFT
R124
120K
R125
100K
C127
224
(P)
RR54
33K
RR64
4.7K
AV-IN
RR22
33K
RR34
33K
RC22
22P (CH)
RC01
10uH
RC15
22P (CH)
RC14
1uF
50V
RR31
4.7K
RR30
1K
RR32
47K
RD04
KSC815-Y
RR29
22K
RR03
KSC815-Y
RR40
1K
RD11 1N4148
RD01 1N4148
RD05 1N4148
RR24 1K
RR25 1K
RR26 1K
RR27 1K
RR28 1K
XC01
331X5
RQ10
C815-Y
RQ09
C815-Y
RR21
1/2W
470
RD04
1N4148
C123
47uF
25V
RR60
10K
RR61
10K
B+
VHF-L
VHF-H
UHF
2 TO 4 DECODER
SW 4
SW 5
SW 2
SW 1
Vcc1
Vcc2
GND
RR06
KSC815-Y
RR23
4.7K
RQ02
KSC815-Y
RR36
4.7K
RQ05
KSC815-Y
S-VIDEO
AV
AV1
VTUNN
VOL.
Bri.
COLOR
CON
Bal/Ton /Hue
VHF-1
VHF-3
AFC
UHF
VTR
AV
Keyb0
Keyb1
Keyb2
Keyb3
KeyB4
KeyB5
KeyB6
Mdstr
GND
VDD
Stdy
SDA
SCL
System
Effect
Sndl
Amot
Sndl
Reset
Xtal1
Xtal2
GND
IDENT
Dosc
VSYNC
Hsync
Fb1
BLue
Green
Red
SYS2
SYS3
PEAKING
IDENT
RC26
103
RD05
1N4148
RR37
1K
RC18
33uF
16V
RX01
10MHZ
TP-29
RR69
4.7K
TP-V/S
V-SYNC
H-SYNC
Q103
KSC815-Y
R-OUT
SR704
10K
R120
3K
Q605
200K
TR21
100
TR09
100
L-OUT
R637
51K
R636
51K
VEE
VSS
IN HIBIT
CONTROL
LOGIC
VDD
D604
1N4148
D603
1N4148
D602
1N4148
D601
1N4148
R624
1K
R623
1K
R622
1K
AV
S-VIDEO
AV-1
R131
100
L101
1.5UH
C113
104
(P)
C118
103
C115
220uF
16V
R101
4.7K
C101
101
RH
C130
102
R137
820
Q101
C388A
C117
103
R150
47
R103
1.2K
R105
100
C104
102
LEFT
[RIGHT]
R626
51K
R630
51K
T102
AFT513800
513-800
T101
R121
100K
C109
220uF
C106
103
C128
331
R126
510
R122
100K
R114
22K
D101
1N4148
R116
2.2K
R109
1K
TP-11
R102
390
Z102
5.5uB
L102
5.6uF
R106
56
VCC
VIDEO OUTPUT AMPLIFIER
REFERENCE AMP.
A.F.C. OUTPUT AMP.
VIDEO PREAMP.
A.F.C. DEMODULATOR
AUXI. VIDEO OUTPUT AMP
A.G.C. NOISE INVERTER
SYNC. DEMODULATOR
AUXI. VIDEO INPUT AMP
I.F.
AMP.
POSITIVE MOD. A.G.C.
GND
R130
1K
R117
22K
C112
103
C103
472
R112
470K
Z101
OFW53963
C102
102
R119
100K
C110
1uF
50V
R118
15K
C105
47uF
16V
C258
0.47uF
(NP)
C116
0.47uF
50V
VR101
50K
RF-AGC
IF
+B
AFT
VL
AGC
VH
VT
U
R123
33K
R127
33
R128
56K
C119
103
R135
6.8K
0.47uF
50V
R136
6.8K
VHF-L
D121
1N4148
C120
10uF
50V
C126
4.7uF
16V
VHF-H
C121
10uF
VT
C125
334
(P)
UHF
C122
10uF
50V
AFT
VHF-L
VHF-H
VT
UHF
AV
AV-1
S-VIDEO
AV-IN
RD08
1N4148
RD10
1N4148
RD09
1N4148
Q701
KSC815-Y
R701
100K
R102
22K
PD01
1N4148
RIGHT
LEFT
BLUE
GREEN
RED
VIDEO
TP-13
C624
4.7uF
(NP)
C614
4.7uF
(NP)
C657
103
(P)
C615
4.7uF
(NP)
C659
102
(P)
C658
102
(P)
R613
470
R614
470
C656
103
(P)
PR01
75
C901
4.7uF
(NP)
RR02
75
R265
1/2K
1K
R266
390
Q203
A539
FB
R267
75
RD14
1N4003
CNC01
TO CONTROL BOARD (CNC01)
CNC03
TO CONTRAL BOARD (CNC05)
CNA07
TO POWER SWITCH